PUBLIC INPUT MEETING REPORT

GENERALLY ACCEPTED AGRICULTURAL AND MANAGEMENT PRACTICES

Manure Management and Utilization, Site Selection and Odor Control for New and Expanding Livestock Production Facilities, the Care of Farm Animals, Irrigation Water Use, and Farm Markets.

Public Input Meeting Held on August 22, 2012

Pursuant to the Michigan Right to Farm Act, (Act 93 of 1981, MCL 286.471 *et seq.*), the Michigan Commission of Agriculture and Rural Development may define Generally Accepted Agricultural and Management Practices (GAAMPs), developed with assistance by the Michigan Department of Agriculture and Rural Development and with written recommendations from Michigan State University's College of Agriculture and Natural Resources, Extension Service, and Agricultural Experiment Station / AgBio Research, as well as the United States Department of Agriculture's Natural Resources Conservation Service and Farm Service Agency; the Michigan Department of Natural Resources; and other professional and industry organizations. In addition, the Commission directed the Department to hold a public meeting to provide an additional opportunity for the public to comment on proposed changes to the GAAMPs. This meeting occurred on August 22, 2012, beginning at 10 a.m. in the Forum Conference Room at the State of Michigan Library and Historical Center, located at 702 West Kalamazoo Street, Lansing, Michigan.

Present from the Michigan Department of Agriculture and Rural Development were Kristin Esch, Heather Casteel, Derek Bajema, and student interns Christopher Jackson and Katharyn Hespe.

Information about this meeting was released to the public and media on July 20, 2012. Over 300 daily, weekly, food, farm, environmental, conservation, legislative, and other media and organizations were notified. In addition, copies of proposed changes to the GAAMPs were posted on the Michigan Department of Agriculture and Rural Development Web Site.

All GAAMPs are developed by multi-agency Task Force Committees which are chaired by Michigan State University faculty. GAAMPs are then presented to the Michigan Commission of Agriculture and Rural Development for consideration and adoption under the Authority of the Michigan Right to Farm Act, Public Act 93 of 1981, as amended. Since their initial adoption, these GAAMPs have under gone annual review by the respective task force committees, which include scientists and others with expertise, education, and knowledge in the field. The Chair of each Task Force gathers comments from committee members and interested stakeholders and then makes recommendations for revisions of the GAAMPs to the Michigan Commission of Agriculture and Rural Development. The Commission ultimately has the authority to approve, amend, or reject those recommendations.

This meeting was held to receive public comment on the 2013 proposed drafts of the Generally Accepted Agricultural and Management Practices (also known as GAAMPs), for:

- Manure Management and Utilization
- Site Selection and Odor Control for New and Expanding Livestock Production Facilities
- Care of Farm Animals

- Irrigation Water Use, and
- Farm Markets

The GAAMPs regarding Nutrient Utilization, Cranberry Production, and Pesticide Utilization and Pest Control have no changes proposed for 2013. However, comments were welcome on any provisions of any of the GAAMPs.

Members of the public attending the meeting were told that a summary of all oral comments and copies of all written comments would be sent to the task force chairs, the Director, and each member of the Commission. The deadline to receive written comments was 5 p.m., August 22, 2012. Copies of all written comments submitted are attached.

In addition to the written comments provided, the following individuals attended the public input meeting on August 22, 2012, and filled out attendance slips:

1. Wendy Banka, Ann Arbor
2. Randy Zellinger, YardWerks LLC, Garden City
3. Frank Mancuso, Mancuso & Cameron P.C., representing Genoa Township
4. Bernie Crequer, Meade Township
5. Vicki Morrone, East Lansing
6. Robert Barnes, Sumner
7. John Jenkins, Manitou Beach

Oral Comments at the public input meeting covered a range of subjects, along the following lines:

- There were multiple comments regarding raising livestock in urban and suburban areas. Speakers discussed the benefits of raising animals, particularly chickens, and expressed concern about any change to the GAAMPs that could result in local units of government prohibiting livestock. They view the 1999 amendments to the Right to Farm Act as preventing local units of government from limiting agricultural practices and they argued that proposed changes to the Site Selection and Odor Control for New and Expanding Livestock Production Facilities would result in local decisions and enforcement and a lack of uniformity on standards, penalties, and enforcement. As a result, they argue this would exclude a large number of people who want to produce crops and livestock but have limited space.
- However, another person spoke in favor of the proposed change to the Site Selection GAAMPs, specifically in favor of allowing local units of government to determine whether or not livestock can be maintained on small lots in residential areas. There was also a concern about the Department's ability to conduct a potentially large volume of site verification and complaint response inspections with a small staff.
- Two speakers addressed site selection and manure storage issues, suggesting that manure lagoons have some of the same potential issues whether for a very large or very small livestock operation, and that siting and odor issues should be considered when a lagoon or secondary containment facility is erected some distance from the livestock facility.
- Several speakers relayed that the livestock industry and the GAAMPs should improve the management of manure as a nutrient resource using new technology that would reduce odor and improve usability of nutrients. There were also concerns about the

impacts of larger volumes of manure and other material originating from large livestock facilities on roads and local infrastructure.

The public input meeting concluded at 11:25 a.m.

Written comments were received from:

1. Wendy Lockwood Banka
2. Jeffrey Pung
3. Janet Kauffman
4. Jerry Rohde
5. Rachel Matthews
6. Michelle R. Brejnak
7. Jeremy Snider
8. Karen Rice
9. Pat Fraser
10. Matthew D. Kapp
11. Jennifer Jewitt
12. Michael Alan Phillips
13. Racheal Blouse
14. Randy Zeilinger
15. Alane Goins
16. Mark Jewett
17. Cara Baker

Bradley N. Deacon
Hearings Officer
September 6, 2012

August 22, 2012

To: 2013 Site Selection GAAMPS Review Committee
Wendy Powers, Michigan State University, Chair
Bill Anderson, Michigan Townships Association
James Clift, Michigan Environmental Council
Michelle Crook, USDA NRCS
Sam Hines, Michigan Pork Producers Association
Larry (Casey) Jones, Allegan County
Matt Kapp, Michigan Farm Bureau
Steve Mahoney, Michigan Department of Agriculture and Rural Development
Ken Nobis, St. Johns
William Renn, Michigan Townships Association
Bruce Washburn, Michigan Department of Environmental Quality
Wayne Whitman, Michigan Department of Agriculture and Rural Development

From: Wendy Lockwood Banka, Ann Arbor, MI

Re: Proposed changes to 2013 GAAMPS

To the 2013 GAAMPS Review Committee(s),

I am writing as an urban farmer in Michigan with four specific proposed changes to existing GAAMPS and to the proposed Draft 2013 GAAMPS. The requested changes follow the body of this letter, and have the same over-arching goal: to restore the unambiguity of the 1999 amendment to the Right to Farm Act to protect the right of all Michigan citizens to establish commercial farming operations of any size and in any place if they comply with generally accepted agricultural management practices (GAAMPS).

The proposed changes to the 2013 GAAMPS mark an important and unwelcome departure from Michigan's Right to Farm tradition for two reasons. First, the proposed changes actively exempt Michigan citizens from RTF protection for reasons unrelated to the agricultural practices of their individual farming operation, and instead exempt Michigan citizens broadly, based only on their zoning status. Second, the breadth of the proposed changes is unprecedented. According to the USDA, 20 percent of Michiganders live in rural areas, while 80 percent are urban; if the 2013 GAAMPS language that you propose is approved, 8 million Michiganders residing in areas where local zoning does not permit agricultural use will lose RTF protection, and will only be allowed to establish farming operations if permitted to do so by their local units of government. Importantly, protection of agriculture at the state rather than the local level is understood in Michigan to be critical, because the state has a much greater interest in agricultural diversity and economic prosperity than townships and municipalities. This trend was widely recognized by the 1999 legislature, and indeed is the reason that they passed an amendment to the Right to Farm act to both remove language that previously gave local units of government such regulatory power, and to add clear language that extended Right to Farm protection to all Michiganders regardless of local ordinance or zoning regulations.

The effect of the changes you propose in these 2013 GAAMPS exactly reverse the 1999 RTF amendment, and returns the power to exercise regulation over commercial farming operations to local units of government. I urge you to reconsider, and to rescind all changes to GAAMPS that weaken RTF protection for any reason not based on sound agricultural science, and to maintain RTF protection for all Michigan citizens.

Sincerely,

Wendy Banka

Wendy Lockwood Banka
wbanka@umich.edu

Proposal 1: Rescind proposed change to the 2013 Site Selection GAAMPS that would change the definition of a Livestock Production Facility as one that has 50 animal units or greater, to one that has 1 animal or greater (p. 3)

Rationale:
No scientific rationale for this change is given, and it does not address environmental or public health concerns. Instead, the purpose of this change appears to be to ensure that other changes proposed in the 2013 Draft GAAMPS will apply to everyone in Michigan who seeks Right to Farm Protection, and not only to those farming operations with 50 or more animal units.

Proposal 2: Rescind all proposed changes to 2013 GAAMPS that add requirements for local zoning input as a prerequisiste for RTF protection. See for example pages 5-10, and 12.

A. The Right to Farm Act as amended in 1999 does not permit rulings from local units of government to infringe on Right to Farm protection.

B. The Introduction to the 2013 Site Selection GAAMPS states "These GAAMPS for Site Selection and Odor Control for New and Expanding Livestock Production Facilities are written to provide uniform, statewide standard and acceptable management practices based on sound science." However, this proposed change in the language to the GAAMPS does not advance standard and acceptable agriculture management practices and is not based on sound science.

C. The proposed changes are not consistent with the mission of MDARD to "Assure the food safety, agricultural, environmental, and economic interests of the people of the State of Michigan are met through service, partnership, and collaboration," and should not be advocated or supported by MDARD or by the members of this committee that represent MDARD.

D. The review committee proposing these changes has no representative of the residential farming community that is affected by the change.

Proposal 3: Change language in the Production Facility Siting Request Application and Information Checklist to remove all requirements for local government input and approval. This includes:

1. In the Verification Checklist (p. 2), information on the Zoning in the area of the proposed project, including verification of local government input/approval/zoning permit.

2. In Conformance with Applicable GAAMPS (p. 4), remove requirement for local unit of government input.

Rationale: The Right to Farm Act as amended in 1999 specifically disallows local units of government from infringing on Right to Farm protection.

Proposal 4: Rescind preamble language added to 2012 GAAMPS.

Rationale: In 2012 preamble language was added to the GAAMPS in response to concerns of the City of Detroit over Right to Farm (RTF) protection of urban farming efforts within its borders. As a result of those discussions, the following language was approved by the Commission of Agriculture and Rural Development during its December 2011 meeting:

> *This GAAMP does not apply in municipalities with a population of 100,000 or more in which a zoning ordinance has been enacted to allow for agriculture provided that the ordinance designates existing agricultural operations present prior to the ordinance's adoption as legal non-conforming uses as identified by the Right to Farm Act for purposes of scale and type of agricultural use.*

The authority to add such language to the GAAMPS was explained to the Agriculture Commission by Jim Johnson, who referenced the following RTF provision:

> *A local unit of government may submit to the director a proposed ordinance prescribing standards different from those contained in generally accepted agricultural and management practices if adverse effects on the environment or public health will exist within the local unit of government.*

However, the 2012 preamble language is inconsistent with Right to Farm legislation for the following reasons:

A. The RTF language does not permit GAAMPS to exempt classes of individuals (e.g., those residing in cities of over 100,000) from RTF protection, but rather provides a mechanism for the definition of additional agricultural management practices at the request of a local unit of government.

   This 2012 GAAMPS preamble language is the first example of GAAMPS language that permits the exemption of any class of Michigan citizens from Right to Farm Protection. If every city of over 100,000 requests and meets the requirements of that preamble statement, then 1.5 million of Michigan's 10 million residents would themselves unprotected by the Michigan Right to Farm Act.

B. The RTF language permits different standards in a specific location *only* if adverse environmental or public health effects will exist in the absence of such changes.

   The 2012 GAAMPS preamble language ignores the requirement that local changes to GAAMPS can only be made under conditions when adverse effects on the environment or public health will otherwise exist within the local unit of government. Instead, cities with more than 100,000 residents are invited to exempt all citizens of their cities from RTF protection, even if no environmental or public health hazards exist.

2

Casteel, Heather (MDA)

From: Pung, Jeffrey (CEPI)
Sent: Tuesday, August 14, 2012 11:52 AM
To: Casteel, Heather (MDA)
Subject: Revised Draft of Manure GAAMP and comments
Attachments: 2013 DRAFT MANURE GAAMP 2012-8-10 (revisions by Jeffrey Pung).rtf

Heather,

I have attached the GAAMP for the Management Practices for Manure Management and Utilization with my proposed edits. The major changes are listed below:

- Removed the Quick Reference information at the beginning of the document. I have replaced the Table of Contents and each subject is link to the area in the document. This allows the use to use the electronic version to quickly find the need reference section.
- There are over 700 tracking changes the include additions, deletions and edit to the information.
- There is no mention of MDARD roll in the verification that the GAAMP is being followed after completed. This no mention if MDARD is performing site visits to determine if the MNMP is being implemented and is being followed.

When the MNMP is complete the data could be entered in an online application (with restricted access to authorized user) to document the progress and completion (and/or acceptance) of the GAAMP. This would allow the data to be used for State and Federal reporting purposes.

Also could there be grant opportunities to assist the farm for implementing the GAAMP; this could offset the cost of running pumps or additional equipment used to implement the MNMP. I am aware there are cost share opportunities with the upfront cost of equipment, but if there could be a fund source to collect the GAAMP data this could offset the cost of long term operational cost to implement the MNMP.

Let me know if you have any additional questions or comments.

Jeffrey Pung
Center for Educational Performance and Information
State Budget Office – DTMB
530 Allegan Street – Mason Building
Lansing, MI 48913
517-241-0181
Pungj1@michigan.gov

Michigan Department of AGRICULTURE & Rural Development

Generally Accepted Agricultural and Management Practices for Manure Management and Utilization

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Draft ~~January~~ 2012~~2~~3

Michigan Commission of Agriculture
& Rural Development
PO Box 30017
Lansing, MI 48909

PH: (517) 373-9797
www.michigan.gov/mda

In the event of an agricultural pollution emergency, such as a chemical/fertilizer spill, manure lagoon breach, etc., the Michigan Department of Agriculture & Rural Development and/or the Michigan Department of Environmental Quality should be contacted at the following emergency telephone numbers:

Michigan Department of Agriculture & Rural Development: (800) 405-0101
Michigan Department of Environmental Quality: (800) 292-4706

If there is not an emergency, but you have questions on the Michigan Right to Farm Act, or items concerning a farm operation, please contact the:

Michigan Department of Agriculture & Rural Development
Right to Farm Program
P.O. Box 30017
Lansing, Michigan 48909
(517) 373-9797
(517) 335-3131~~29~~ FAX
(Toll Free)
(877) 632-1783

Authority: Act 93 of 1981, as amended
TOTAL NUMBER OF COPIES PRINTED: 500
TOTAL COST: $1,165.71 COST PER COPY: $2.3254

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TABLE OF CONTENTS

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PREFACE

The Michigan legislature passed into law the Michigan Right to Farm Act (Act 93 of 1981, as amended), which requires the establishment of Generally Accepted Agricultural and Management Practices (GAAMPs). These practices are written to provide uniform, statewide standards and acceptable management practices based on sound science. These practices can serve producers in the various sectors of the industry to compare or improve their own managerial routines. New scientific discoveries and changing economic conditions may require necessary revision of the GAAMPs.

The GAAMPs that have been developed are as follows:

1) 1988-Manure Management and Utilization
2) 1991-Pesticide Utilization and Pest Control
3) 1993-Nutrient Utilization
4) 1995-Care of Farm Animals
5) 1996-Cranberry Production
6) 2000-Site Selection and Odor Control for New and Expanding Livestock Production Facilities
7) 2003-Irrigation Water Use
8) 2010 Farm Market

These GAAMPs were developed with industry, university, and multi-governmental agency input. As agricultural operations continue to change, new practices may be developed to address the concerns of the neighboring community. Agricultural producers who voluntarily follow these practices are provided protection from public or private nuisance litigation under the Right to Farm Act.

This GAAMP does not apply in municipalities with a population of 100,000 or more in which a zoning ordinance has been enacted to allow for agriculture provided that the ordinance designates existing agricultural operations present prior to the ordinance's adoption as legal non-conforming uses as identified by the Right to Farm Act for purposes of scale and type of agricultural use.

The MDARD website for the GAAMPs is http://www.michigan.gov/gaamps.

I. INTRODUCTION

Like all other segments of our economy, agriculture has changed significantly during the past 50 years and will continue to change in the future. The trend toward larger facilities (the overwhelming majority being family owned and operated) has resulted in farm operations being more capital intensive and less labor intensive. Larger farm size offers marketing advantages and generally lower unit cost of production compared to smaller sized operations. However, increased farm size brings new management challenges for environmental protection, animal care, and neighbor relations.

Animal agriculture in Michigan must have the flexibility ~~and opportunity to change agricultural enterprises~~ to ~~and~~ adopt new technology to remain economically viable and remain competitive in the market place while being protective of the environment. If a healthy, growing livestock industry in Michigan is to be assured, efforts must continue to address concerns of livestock producers and their neighbors, particularly in two areas: (1) producers who use GAAMPs in their livestock operations should be protected from harassment and nuisance complaints and (2) persons living near livestock operations, who do not follow GAAMPs, need to have concerns addressed when odor nuisance or water quality problems occur.

No two livestock operations in Michigan can be expected to be the same, due to the large number of variables, which together determine the nature of a particular operation. The GAAMPs presented in this document provide options to assist with the development of environmental practices for a particular farm that prevents surface water and groundwater pollution.

These GAAMPs are referenced in Michigan's Natural Resources and Environmental Protection Act (NREPA), Act 451 of 1994, as amended. NREPA protects the waters of the state from the release of pollutants in quantities and/or concentrations that violate established water quality standards. In addition, the GAAMPs utilize the nationally recognized construction and management standard to provide runoff control for a 25-year, 24-hour rainfall event. Air quality issues related to production agriculture are addressed in the Odor Management Section.

About This Document

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~~For quick reference, management practices are first presented as a numbered list. This list is not meant to convey all the information regarding GAAMPs. Rather, it is intended to be a useful tool to assist individuals in determining what management practices exist and in what section of this document further information can be found.~~ The remainder of the document provides additional information on each of these management practices and is categorized in four areas: 1) runoff control and wastewater management, 2) odor management, 3) construction design and management for manure storage and treatment facilities, and 4) manure application to land. Throughout

this document you will find some text that is bolded and other text that is not. Section headings and recommended management practices in the GAAMPs for Manure Management and Utilization are in **bold text**. The un-bolded text provides supplemental information to help clarify the intent of the recommended management practices.

Appendix A provides essential data for manure management system planning.

Appendix B discusses the difference between Manure Management System Plans (MMSP) and Comprehensive Nutrient Management Plans (CNMP) and explains who needs a CNMP.

Comment [PJ(3]: New Paragraph

Appendix C shows a sample MMSP to help the reader become more familiar with the type of information that is typically included in an MMSP.

The list of references ~~that~~ at the end of this document can provide detailed information is not supplied in this document.

Quick Reference to the GAAMPs for Manure Management and Utilization

II. .... R
unoff Control and Wastewater Management

1. .... F
acilities may be paved, partially paved around waterers and feed bunks, or unpaved.

2. .... R
unoff control is required for any facility if runoff from a lot leaves the owner's own property or adversely impacts surface and/or groundwater quality. Examples include runoff to neighboring land, a roadside ditch, a drain ditch, stream, lake, or wetland.

3. .... M
ilk parlor and milk house wastewater shall be managed in a manner to prevent pollution to waters of the state.

4. .... P
rovisions should be made to control and/or treat leachate and runoff from stored manure, silage, food processing by-products, or other stored livestock feeds to protect groundwater and surface waters.

5. .... R
unoff storage basins should be designed to contain normally occurring direct precipitation and resulting runoff and manure that accumulate during the storage times projected in the Manure Management System Plan. In addition, storage volume should be provided that will contain the direct rainfall and runoff that occur as a result of the average 25-year, 24-hour rainfall event for the area. Storage basins must be constructed to reduce seepage loss to acceptable levels.

6. .... A
pplication rates should be determined based upon the ability of the soil to accept and store the water and the ability of plants growing in the application area to utilize nutrients. Land application should be done when the water can be used beneficially by a growing crop.

7. .... A
n alternative to a storage structure is a structure for settling solids and an infiltration area in accordance with NRCS Conservation practice standard Wastewater Treatment Strip (635) (USDA-NRCS-MI FOTG) for handling lot runoff, and/or silage leachate wastewater. The vegetative area may be either, a long, grassed, slightly sloping channel, or a broad, flat area with little or no slope, surrounded by a berm or dike. All outside surface water should be excluded from

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~~the infiltration area so that the only water applied is lot runoff and/or silage leachate and direct precipitation. Vegetation should be maintained and harvested at least once per year to prevent excessive nutrient build up in the soil of the infiltration area.~~

~~8. Stocking densities and management systems should be employed which ensure that desirable forage species are present with an intensity of stand sufficient to slow the movement of runoff water and control soil erosion and movement of manure nutrients from the pasture land. See the NRCS conservation practice standard Prescribed Grazing (528) (USDA-NRCS-MI FOTG) for criteria.~~

~~9. Livestock should be excluded from actual contact with streams or water courses except for controlled crossings and accesses for water or in accordance with the NRCS conservation practice standard Prescribed Grazing (528) (USDA-NRCS-MI FOTG).~~

~~10. Runoff from pasture feeding and watering areas should travel through a vegetated filter area to protect surface and groundwater. See the NRCS conservation practice standards Wastewater Treatment Strip (635) and Filter Strip (393) (USDA-NRCS-MI FOTG) for criteria.~~

~~11. Provisions should be made to collect, store, utilize, and/or treat manure accumulations and runoff from outside open lots used for raising livestock.~~

~~**III. Odor Management**~~

~~12. Livestock producers should plan, design, construct, and manage their operations in a manner that minimizes odor impacts upon neighbors.~~

~~13. The odor of fermented feed materials, such as corn or hay silage, can be minimized by harvesting and storing them at an appropriate dry matter content (generally greater than 33 percent dry matter).~~

~~14. Frequent (daily or every few days) removal of manure from animal space, coupled with storage or stacking and followed by application to cropland at agronomic rates, is an acceptable practice throughout Michigan.~~

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15. Solid manure that may contain bedding materials and/or is dried sufficiently, such as that from poultry, cattle, sheep, swine, horse, and fur-bearing animal facilities can be temporarily stacked outside the livestock building.

16. New outside lot systems should not be located in close proximity to residences and other odor-sensitive land uses. They should not be located uphill along a confining valley leading toward residences. New residences or other sensitive land uses should not be located within close proximity to existing outside lot facilities. (For additional guidance, see the GAAMPs for Site Selection and Odor Control for New and Expanding Livestock Production Facilities).

17. Use covered manure storage if technically and economically feasible.

18. Where possible, do not locate manure storage in close proximity to residential areas.

19. Avoid spreading when the wind is blowing toward populated areas.

20. Avoid spreading on weekends/holidays when people are likely to be engaged in nearby outdoor and recreational activities.

21. Spread in the morning when air begins to warm and is rising, rather than in late afternoon.

22. Use available weather information to best advantage. Turbulent breezes will dissipate and dilute odors, while hot and humid weather tends to concentrate and intensify odors, particularly in the absence of breezes.

23. Take advantage of natural vegetation barriers, such as woodlots or windbreaks, to help filter and dissipate odors.

24. Establish vegetated air filters by planting conifers and shrubs as windbreaks and visual screens between cropland and residential developments.

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25...I
ncorporate manure into soil during, or as soon as possible after application. This can be done by (a) soil injection or (b) incorporation within 48 hours after a surface application when weather conditions permit. However, incorporation may not be feasible where manures are applied to pastures or forage crops, such as alfalfa, wheat stubble, etc., or where no-till practices are used (see Section V).

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IV. C
onstruction Design and Management for Manure Storage and Treatment Facilities

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26...C
onstruction design for manure storage and treatment facilities should meet standards and specifications in accordance with NRCS conservation practice standard Waste Storage Facility (313) (USDA-NRCS-MI FOTG). Additional publications that can be used are the Concrete Manure Storages Handbook MWPS-36 (MidWest Plan Service, 1994) and Circular Concrete Manure Tanks publication TR-9 (MidWest Plan Service, 1998).

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27...T
o protect groundwater from possible contamination, utilize liners that meet standards and specifications in accordance with NRCS conservation practice standard Waste Storage Facility (313) (USDA-NRCS-MI FOTG). Liners include natural existing soil (Barrington and Jutras, 1985; Barrington *et al*., 1987a, 1987b), bentonite or similar high swell clay materials, compacted earthen liners, and flexible membranes.

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28...A
ll manure storage structures shall maintain a minimum freeboard of twelve inches (six inches for fabricated structures) plus the additional storage volume necessary to contain the precipitation and runoff from a 25-year, 24-hour storm event.

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V. ....M
anure Application to Land

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29...A
ll fields used for the production of agricultural crops should have soils sampled and tested on a regular basis to determine where manure nutrients can best be utilized.

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30...U
se fertilizer recommendations, consistent with those of Michigan State University, to determine the total nutrient needs for crops to be grown on each field that could have manure applied.

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31. To determine the nutrient content of manure, analyze it for percent dry matter (solids), ammonium N (NH_4-N), and total N, P, and K.

32. The agronomic (fertilizer) rate of N recommended for crops (consistent with Michigan State University N fertilizer recommendations) should not be exceeded by the amount of available N added, either by manure applied, by manure plus fertilizer N applied, and/or by other N sources. For legume crops, the removal value of N may be used as the maximum N rate for manure applications. The available N per ton or per 1000 gallons of manure should be determined by using a manure analysis and the appropriate mineralization factors (see Manure Management Sheet #2, MSUE Bulletin E-2344 by Jacobs *et al.*, 1992b) for organic N released during the first growing season following application and the three succeeding growing seasons.

33. If the Bray P1 soil test level for P reaches 150 lb/acre (75ppm), manure applications should be reduced to a rate where manure P added does not exceed the P removed by the harvested crop. (If this manure rate is impractical due to manure spreading equipment or crop production management, a quantity of manure P equal to the amount of P removed by up to four crop years can be used for the first crop year, if no additional fertilizer or manure P is applied for the remaining crop years, and this rate does not exceed the N fertilizer recommendations for the first crop grown.) If the Bray P1 soil test reaches 300 lb/acre (150ppm) or higher, manure applications should be discontinued until nutrient harvest by crops reduces P test levels to less than 300 lb/acre (150ppm). To protect surface water quality against discharges of P, adequate soil and water conservation practices should be used to control runoff and erosion from fields where manure is applied.

34. Manures should be uniformly applied to soils. The amount of manure applied per acre (gallons/acre or tons/acre) should be known, so manure nutrients can be effectively managed.

35. Manures should not be applied to soils within 150 feet of surface waters or to areas subject to flooding unless: (a) manures are injected or surface-applied with immediate incorporation (i.e., within 48 hours after application) and/or (b) conservation practices are used to protect against runoff and erosion losses to surface waters.

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36...L
iquid manure applications should be managed in a manner to optimize nutrient utilization and not result in ponding, soil erosion losses, or manure runoff to adjacent property, drainage ditches or surface water. Manure applications to crop land with field drainage tiles should be managed in a manner to keep the manure within the root zone of the soil and to prevent manure from reaching tile lines.

37...A
s land slopes increase from zero percent, the risk of runoff and erosion also increases, particularly for liquid manure. Adequate soil and water conservation practices should be used which will control runoff and erosion for a particular site, taking into consideration such factors as type of manure, bedding material used, surface residue or vegetative conditions, soil type, slope, etc.

38...W
here application of manure is necessary in the fall rather than spring or summer, using as many of the following practices as possible will help to minimize potential loss of NO_3-N by leaching: (a) apply to medium or fine rather than to coarse textured soils; (b) delay applications until soil temperatures fall below 50°F; and/or (c) establish cover crops before or after manure application to help remove NO_3-N by plant uptake.

39...A
pplication of manure to frozen or snow-covered soils should be avoided, but where necessary, (a) solid manures should only be applied to areas where slopes are six percent or less and (b) liquid manures should only be applied to soils where slopes are three percent or less. In either situation, provisions must be made to control runoff and erosion with soil and water conservation practices, such as vegetative buffer strips between surface waters and soils where manure is applied.

40...R
ecords should be kept of manure analyses, soil test reports, and rates of manure application for individual fields.

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II. RUNOFF CONTROL AND WASTEWATER MANAGEMENT

Rainfall and snowfall-induced runoff from uncovered livestock facilities requires control to protect neighboring land areas and prevent direct discharge to surface or groundwaters. Livestock facilities, which require runoff control, include all holding areas where livestock density precludes sustaining vegetative growth on the soil surface.

1. **Facilities may be paved, partially paved around waterers and feed bunks, or unpaved.**
2. **Runoff control is required for any facility if runoff from a lot leaves the owner's own property or adversely impacts surface and/or groundwater quality. Examples include runoff to neighboring land, a roadside ditch, a drain ditch, stream, lake, or wetland.**
3. **Milk parlor and milk house wastewater shall be managed in a manner to prevent pollution to waters of the state.**
4. **Provisions should be made to control and/or treat leachate and runoff from stored manure, silage, food processing by-products, or other stored livestock feeds to protect groundwater and surface waters.**

Refer to USDA-NRCS-MI FOTG conservation practices, Chapter 6 of MWPS-18 (MidWest Plan Service, 1993), Guideline for Milking Center Wastewater, Natural Resource, Agriculture, and Engineering Service (NRAES-115 by Wright and Graves, 1998) for runoff control and wastewater management guidance.

Storage Facilities for Runoff Control

Runoff control can be achieved by providing facilities to collect and store the runoff for later application to cropland.

5. **Runoff storage facilities should be designed to contain normally occurring direct precipitation and resulting runoff and manure that accumulate during the storage times projected in the Manure Management System Plan. In addition, storage volume should be provided that will contain the direct rainfall and runoff that occur as a result of the average 25 year, 24 hour rainfall event for the area. Storage facilities must be constructed to reduce seepage loss to acceptable levels.**

Land Application of Runoff

Equipment must be available for land application of stored runoff wastewater. Land application should be done when the soil is dry enough to accept the water.

6. **Application rates should be determined based upon the ability of the soil to accept and store the runoff and wastewater and the ability of plants growing in the application area to utilize nutrients. Land application should be done when the wastewater can be used beneficially by a growing crop. On fields testing over 150 ppm P (300 lb P/acre) soil test Bray P1, there may be instances where on-farm generated wastewater, ≤1 percent solids, can be utilized if applied at rates that supply 75 percent or less of the annual phosphorus removal for the current crop or next crop to be harvested.**

In these instances, the following conditions must be met:

a) **annual sampling of the applied wastewater to determine its P content, so P_2O_5 loadings can be calculated;**
b) **soil P test levels must show a progressive decline over time;**
c) **no other phosphorus can be applied to the crop field from other sources;**
d) **when using irrigation as an application method, the GAAMPs for Irrigation Water Use must be followed to ensure that irrigation scheduling is used to meet and not exceed evapotranspiration needs of the crop/soil system to avoid excess wastewater disposal that would flush soluble phosphorus past the depth of crop rooting; and**
e) **tile drained fields must be monitored in accordance with GAAMP 36;**

Sprinkler irrigation methods will provide uniform application of liquid with minimum labor requirements. Directing lot runoff through a structure for settling solids can reduce odor from the liquid storage and application to the land (refer to NRCS conservation practice standard Waste Storage Facility (313) (USDA-NRCS-MI FOTG) & MWPS-18). For additional guidance, refer to Section III. - Odor Management Practices.

Infiltration Areas

7. **An alternative to a storage structure is a structure for settling solids and an infiltration area in accordance with NRCS Conservation practice standard Wastewater Treatment Strip (635) (USDA-NRCS-MI FOTG)for handling lot runoff, and/or silage leachate wastewater. The vegetative area may be either a long, grassed, slightly sloping channel or a broad, flat area with little or no slope, surrounded by a berm or dike. All outside surface water should be excluded from the infiltration area so that the only water applied is lot runoff and/or silage leachate and direct precipitation. Vegetation should be maintained and harvested at least once per year to prevent excessive nutrient build up in the soil of the infiltration area.**

Design information about infiltration areas, such as sizing, establishment, and maintenance, is available in the NRCS conservation practice standard Wastewater Treatment Strip (635) (USDA-NRCS-MI FOTG), MWPS-18, or the Pork Industry Handbook (MSU Extension Bulletin E-1132 by Vanderholm and Nye, 1987). These systems are not practical for every situation. Additional information is available in MWPS-18.

Pasture Systems

Pasture land is land that is primarily used for the production of forage upon which livestock graze. Pasture land is characterized by a predominance of vegetation consisting of desirable forage species (see Moline *et al*., 1991; Moline and Plummer, 1991). Sites such as loafing areas, confinement areas, or feedlots which have livestock densities that preclude a predominance of desirable forage species are not considered pasture land.

8. **Stocking densities and management systems should be employed which ensure that desirable forage species are present with an intensity of stand sufficient to slow the movement of runoff water and control soil erosion and movement of manure nutrients from the pasture land. See the NRCS conservation practice standard Prescribed Grazing (528) (USDA-NRCS-MI FOTG) for criteria.**
9. **Livestock should be excluded from actual contact with streams or water courses except for controlled crossings and accesses for water or in accordance with the NRCS conservation practice standard Prescribed Grazing (528) (USDA-NRCS-MI FOTG).**

As authorized by the Riparian Doctrine, producers are entitled to utilize surface waters traversing their property. However, this use is limited to activities, which do not result in water quality degradation. The goal for controlling livestock access to surface waters is to prevent water quality degradation. Livestock can impact water quality by the erosion of sediment and nutrients from stream banks and by the direct deposition of manure nutrients, organic matter, and pathogens into surface water.

Direct deposition is effectively prevented by restricting livestock to controlled access locations. Banks are effectively stabilized by maintaining vegetation or, as in the case of controlled watering accesses and crossings, stream banks and beds may be stabilized with appropriate protective cover, such as concrete, rocks, crushed rock, gravel, or other suitable cover. In addition to addressing environmental and public health aspects, controlling livestock access to surface water and providing alternate drinking water sources may improve herd health by reducing exposure to water and soil-borne pathogens.

10. **Runoff from pasture feeding and watering areas should travel through a vegetated filter area to protect surface and groundwater. See the NRCS conservation practice standards Wastewater Treatment Strip (635) and Filter Strip (393) (USDA-NRCS-MI FOTG) for criteria.**

Outside Lots

11. **Provisions should be made to collect, store, utilize, and/or treat manure accumulations and runoff from outside open lots used for raising livestock.**

Outside open lots used for raising livestock are areas of animal manure accumulation. Maintenance of open lot systems requires manure handling methods to periodically remove accumulated solid or semisolid manure and control lot runoff. Solid manure is typically transferred from the lot to storage facilities or equipment for application to cropland. The frequency of removal of accumulated manure will depend on the animal density (square feet of lot area per animal), the amount of time the animals spend on the lot, the animal size, and the type of feed system. Clean runoff should be diverted away from the livestock lot area. While paved lots generally result in more runoff than unpaved lots, a paved surface improves manure collection and runoff control and minimizes the potential for groundwater contamination.

III. ODOR MANAGEMENT

~~The~~ There are 2 main goals for effective odor management~~;~~ ~~is~~ first, to reduce the frequency, intensity, duration and offensiveness of odors, and second, to manage the operation in a way that tends to create a positive attitude toward the operation. Because of the subjective nature of human responses to certain odors, recommendations for appropriate technology and management practices are not an exact science. The recommendations in this section represent the best professional judgment available.

The following 14 management practices (#12-25) provide guidance on how to minimize potential odors from livestock operations. Producers should select those practices which are applicable to their livestock operations and develop an Odor Control Plan as part of their Manure Management System Plan (MMSP). See Appendix C for a sample MMSP that contains an example Odor Control Plan (section IX).

12. **Livestock producers should plan, design, construct, and manage their operations in a manner that minimizes odor impacts upon neighbors.**

The proximity of livestock operations to neighbors and populated areas is usually the most critical factor in determining the level of technology and management needed to

minimize odor impacts upon neighbors. Therefore, site selection is an important factor in minimizing odor impacts for and upon neighbors. ~~The more remote the livestock operation, the better the~~ A livestock operation that is more remote has a better likelihood that odors will not become an annoyance for neighbors; and, therefore, a lower level of technology and management will adequately manage odors at the livestock facility. However, the distance which a livestock operation should be located from neighboring land uses to effectively control odors is not easily established. Additional information and recommendations can be found in the current GAAMPs for Site Selection and Odor Control for New and Expanding Livestock Operations.

The basic principles upon which the most common and effective techniques for odor control ~~are based~~ include (a) reducing the formation of odor-causing gases and (b) reducing the release of odorous gases into the atmosphere. The degree to which these principles can be applied to the various odor sources found in livestock operations depends on the level of technology and management utilization ~~that can be utilized~~. Feed materials and manure are the most common and predominant sources of odor and are discussed in the following subsections.

Feed Materials

Using fermented feeds, such as corn or hay silage, is an acceptable animal husbandry practice throughout Michigan for dairy and beef cattle, horses, sheep, and goats. Some odors associated with the storage and feeding of these materials are normal for these livestock operations.

13. The odor of fermented feed materials, such as corn or hay silage, can be minimized by harvesting and storing them at an appropriate dry matter content (generally greater than 33 percent dry matter).

The practice of feeding human foodstuffs, surplus and processing by-products (e.g., cull potatoes, dairy milk or whey, cereal by-products, surplus garden and orchard produce, pastry by-products, sugar beet pulp, and sweet cornhusks) to livestock is a generally accepted practice. This is especially common where livestock operations exist within close proximity to food production and food processing facilities. Using these materials for livestock feed diverts useful by-products (that can pose a substantial load on local sewage treatment plants and a major problem for food processing plants) from the waste stream and converts them into a valuable resource. Properly handled in a livestock operation~~,~~ these feeds pose no threat to the environment. These products may require special feed handling systems and may substantially increase or change the manure generated by the animals to which they are fed. Some by-products themselves and/or the manure produced by livestock with their consumption can be the source of unusual, offensive, and intense odors. In these situations, feed handling and manure management practices should be used to ~~control and~~ minimize (or control) the frequency and duration of such odors. Garbage is defined in Act 466 of 1988, as

amended; Section 287.704 as products containing animal materials and cannot be fed to livestock in Michigan.

Manure

Fresh manure is usually considered to be less odorous than anaerobically decomposing manure. Fresh manure emits ammonia but ~~in general~~ is generally not accompanied by other products of decomposition~~,~~ which contribute to odors.

14. **Frequent (daily or every few days) removal of manure from animal space, coupled with storage or stacking and followed by application to crop land at agronomic rates~~,~~ is an acceptable practice throughout Michigan.**

Manure odors are generally those associated with the anaerobic (in the absence of oxygen) decomposition of organic material by microorganisms. The intensity of odors depends upon the biological reactions that take place within the material, the nature of the excreted material (which is dependent upon the species of animal and its diet), the type of bedding material used, and the surface area of the odor source. Sources of decomposing manure can include stacked solid manure, outside lots when manure is allowed to accumulate, uncovered manure storages, manure treatment systems, and land application areas.

Stacked Solid Manure

15. **Solid manure that may contain bedding materials and/or is dried sufficiently~~,~~ (~~such as that~~ i.e., from poultry, cattle, sheep, swine, horse, and fur-bearing animal facilities~~,~~) can be temporarily stacked outside the livestock building.**

Farmstead Stockpiling

Stockpiling manure at a farmstead is an acceptable practice that should be protective of the environment and mindful of neighbors. Manure should be stockpiled on an impermeable pad with sides to prevent leachate and runoff. Stockpiling manure on the ground is an acceptable practice with the following appropriate management: ~~such as~~

- ~~r~~Rotating locations and complete periodic removal of manure from the location annually or more frequently~~,~~.
- Maintain records documenting timing of manure removal and the location used~~,~~. ~~and~~
- ~~s~~Seeding of the previous location after removal to allow for vegetation to take up the nutrients that have accumulated in the soil.

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In addition, the stockpile should be in a location that does not allow for runoff to flow onto neighboring property or into surface waters. The location should also consider odors and pests if the stockpile is in close proximity to homes, schools or other high use areas. The following ~~P~~practices can help reduce oders:~~such as~~

a) ~~c~~Cover~~ing~~ the stockpiled manure~~.~~ with a tarp, fleece blanket, straw, woodchips or other materials~~,~~. ~~or~~
b) ~~a~~Additives such as lime~~,~~ can be used to help reduce odors and pests.
c) Manure stockpiles need to be kept at least 50 feet away from property lines or 150 feet away from non-farm homes unless a tarp, fleece blanket, or straw cover is maintained.

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Field Stockpiling

Temporary stockpiling of manure at field application sites may be necessary when crop production and field conditions preclude immediate application to cropland.

a) The stockpile should be in a location that does not allow for runoff to flow onto neighboring property or into surface waters. The location should also consider odors and pests if the stockpile is in close proximity to homes, schools or other high use areas.
b) Practices such as a tarp, a straw cover, or additives such as lime, can be used to help reduce odors and pests.
c) Proximity to surface water, field drainage, predominate wind direction, field slope and applicable conservation practices should be factored into infield manure stacking locations.
d) Manure stockpiles need to be kept at least 150 feet from non-farm homes.
e) Manure stockpiles also need to be kept at least 150 feet from surface waters or areas subject to flooding unless conservation practices are used to protect against runoff and erosion losses to surface waters.

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Manure that is temporarily stockpiled in the field should be spread as soon as field and weather condition allow, and not exceed six months, or if covered with an impermeable cover, twelve months. Timely application of stockpiled manure to land at agronomic rates and soil incorporation within 48 hours after application will help to control odors and may have nutrient management crop production benefits. Leachate from solid stacked manure is subject to control as described in Section II, Runoff Control and Wastewater Management, Practice No. 4. Odors from such manure storages are minimal, except when disturbed such as during removal for application to land.

Livestock operations may utilize a variety of bedding materials as part of their manure management system. The use of straw, hay, sand, sawdust, wood shavings, waste paper, or other suitable materials, either individually or in combination as livestock or poultry bedding, is a common generally accepted practice. Bedding materials should be of an appropriate size to maximize absorptive properties and to prevent blowing and

dispersion when subsequently applied to cropland. Waxed paper, aluminum foil, and plastics should not be present in bedding material.

Outside Lots

Outside open lots with or without shelters are acceptable for raising livestock in Michigan. In these systems, manure is deposited over a relatively large surface area per animal (compared to a roofed confinement system for example) and begins to decompose in place. Odor impacts can be mitigated by keeping the lot surface as dry as possible; thus limiting the microbiological activity that generates odors. Providing adequate slopes, orientation that takes advantage of sunlight, diverting up-slope runoff water away from the lot, and using recommended stocking densities will enhance drying of the lot surface. The MWPS-18, National Pork Industry Handbook, and Michigan Beef Production Notebook provide details and alternatives to accomplish this. Most feed additives and odor control chemicals applied to feedlot surfaces have not been demonstrated to be effective in reducing odors from feedlots in humid areas, such as Michigan.

In spite of good facilities design and management, odors may be generated from outside livestock lot systems. The intensity of these odors is somewhat proportional to the surface area of the odor producing sources. The frequency of impact and offensiveness to neighbors is often related to the distance to neighbors' houses and their location relative to prevailing winds.

16. **New outside lot systems should not be located in close proximity to residences and other odor-sensitive land uses. They should not be located uphill along a confining valley leading toward residences. New residences or other sensitive land uses should not be located within close proximity to existing outside lot facilities. (For additional guidance see the GAAMPs for Site Selection and Odor Control for New and Expanding Livestock Production Facilities).**

Storages and Acceptable Covers

17. **Use covered manure storage if technically and economically feasible.**
18. **Where possible, do not locate manure storage in close proximity to residential areas.**

The primary objective of storage is to temporarily store the manure before application to land. However, some biological activity occurs in these storages, and the gases generated can be a source of odors. If storage facilities are left uncovered, the potential for manure odors to be carried away by air movement will increase. Various types of

covers can be used to prevent wind driven air from coming into direct contact with a liquid manure surface and incorporating odors.

Acceptable covers that can retard odor escape from manure storages include the following:

a) Natural fibrous mats similar to those which develop on liquid manure storages receiving manure from beef and dairy cattle fed a high roughage diet.
b) Slotted flooring or other underbuilding tanks. Ventilation must be provided in the building to prevent accumulation of noxious and flammable gases.
c) A flexible plastic or similar material that covers the liquid surface and is of such strength, anchorage and design that the covering will not tear or pull loose when subjected to normal winds that have an average recurrence interval of 25 years. Gas escape ports should be provided which allow any gas that may evolve to escape.
d) A solid covering such as concrete, wood, plastic or similar materials that covers the entire liquid surface and is of such strength, anchorage, and design that it will withstand winds and expected vertical loads. Adequate air exchange should be provided which will prevent the occurrence of explosive concentrations of flammable gases.

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Treatment Systems

A biological treatment system is designed to convert organic matter (feed, bedding, animal manure, and other by-products) to more stable end products. Anaerobic processes (i.e., without free oxygen) can liquefy or degrade high BOD (biochemical oxygen demand) (BOD) wastes. They can decompose more organic matter per unit volume than aerobic treatment processes. Aerobic processes require free oxygen and are helpful in reducing odor but are generally not considered economical for livestock operations. Extreme environmental changes alter microbial activity. When microorganisms are stressed by their environment, waste treatment processes can malfunction, and odors may become more intense.

Lagoons and Storage Facilities

Anaerobic treatment lagoons are generally basins containing diluted manure and are designed to provide degradation of the organic material. Well-designed and managed anaerobic lagoons can be short-term odor sources. The occurrence of purple sulfur-fixing bacteria can significantly reduce odors from an anaerobic treatment lagoon. The intensity of odors is usually greatest during the early spring and occasionally in the fall.

Aerobic treatment of manure liquids can be accomplished by natural or mechanical aeration. In a naturally-aerated system, such as a (i.e., facultative oxidation treatment lagoon), an aquatic environment occurs in which photosynthesis from algae and surface aeration from the atmosphere provides an aerobic zone in the upper regions of the

treatment lagoon. A transition zone occurs below this aerobic zone that has a limited amount of oxygen. This is the facultative zone where bacteria are present that can live either with or without oxygen. At the bottom, there may be a sludge layer that is anaerobic. The processes that occur in the aerobic zone have a low odor potential~~,~~ and the odorous compounds that are created in the facultative and anaerobic zones are converted to low odor forms in the aerobic zone. For a naturally aerated system to function properly, design specifications and quantities of manure solids to be treated must be closely followed.

An aerobic treatment lagoon should be loaded at a rate no higher than 44 pounds of ultimate BOD/day/acre. The material in the treatment lagoon should be diluted enough to allow light to penetrate three to four feet into the water. The lagoon should be a minimum of four feet deep (or deeper to allow for accumulation of sludge) to prevent rooted vegetation from growing from the bottom of the lagoon.

Mechanically-aerated systems can be used to treat animal manures to control odors, decompose organic material, remove nitrogen, conserve nitrogen, or a combination of these functions. When adequate oxygen is supplied, a community of aerobic bacteria grows that produce materials with low odor potential. Alternative treatment systems to accomplish mechanical aeration include facultative lagoons, oxidation ditches, or completely mixed lagoons.

Storage facilities are designed for manure storage only with no manure treatment. Treatment lagoons (aerobic and anaerobic) are designed specifically for manure treatment.

Effluent from treatment lagoons and storage basins should be land applied to avoid long-term and extensive ponding and to utilize manure nutrients at agronomic rates (see Section V). Construction design for treatment lagoons and storage basins should conform to the recommendations in Section IV.

Composting

Composting is a self-heating process carried on by bacteria, actinomycetes and fungi that decompose organic material in the presence of oxygen. Composting of organic material, including livestock and poultry manures, can result in a ~~rather~~ stable end product. ~~that does not support extensive microbial or insect activity, if the process and systems are properly designed and managed.~~ If the process and systems are properly designed and managed the end product does not support extensive microbial or insect activity. The potential for odors during the composting process depends upon the following elements:

a) ~~m~~Moisture content of the organic material.~~,~~
b) ~~t~~The carbon-nitrogen ratio.~~,~~

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c) ~~t~~The presence of adequate nutrients.~~,~~
d) ~~t~~The absence of toxic levels of materials that can limit microbial growth.~~,~~ ~~and~~
e) ~~a~~Adequate porosity to allow diffusion of oxygen into the organic material for aerobic decomposition of the organic material.

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Stability of the end product, ~~and~~ its potential to produce nuisance odors~~,~~ and/or to be a breeding area for flies~~,~~ depends upon the degree of organic material decomposition and the final moisture content. Additional information and guidance about alternatives for composting manures are available in the "On-Farm Composting Handbook" (Rynk, 1992) and the National Engineering Handbook (USDA, 2000). The occurrence of leachate from the composting material can be minimized by controlling the initial moisture content of the composting mixture to less than 70 percent and controlling water additions to the composting material from rainfall. Either a fleece blanket[1] or a roofed structure can be used as a cover to control rainfall additions or leachate from composting windrows.

Provisions should be made to control ~~and/~~ (or treat) leachate and runoff to protect groundwater and surface water. If the composting process is conducted without a cover~~,~~ provisions must be made to collect the surface runoff. ~~and it either~~ The surface water can be handled in the following manner:

a) ~~b~~Be temporarily stored (see Section IV) and applied to land (see Section V).~~,~~
b) ~~a~~Added to the composting material for moisture control during the composting process.~~,~~ ~~or~~
~~a)~~c) Applied to grassed infiltration areas (see Section II). ~~a~~

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[1] A fleece blanket is a non-woven textile material made from synthetic fibers, such as polypropylene. The non-woven texture of a fleece blanket prevents rainfall from penetrating into the composting material, but allows the necessary exchange of carbon dioxide and oxygen.

Anaerobic Digesters

Methane can be produced from organic materials, including livestock and poultry manures by anaerobic digestion. This process converts the biodegradable organic portion of animal wastes into biogas (a combination of methane and carbon dioxide). The remaining semi-solid is relatively odor free but still contains all the nitrogen, phosphorus, and potassium originally present in the animal manure, although some of the nitrogen can be lost after storage in a holding structure. Anaerobic digestion is a stable and reliable process.~~,~~ ~~as long as~~ Providing the digester is loaded daily with a uniform quantity of waste, digester temperature does not fluctuate widely~~,~~ and antibiotics in the waste do not slow biological activity.

Application of Manure to Land

Manure applications ~~can and~~ should be managed to avoid and minimize nuisance odor conditions that may be experienced by neighbors. Livestock and poultry manure applied to cropland at agronomic rates followed by timely soil incorporation~~,~~ (where feasible)~~,~~ helps to control excessive odors. The following list of practices may be used to reduce odor in the application of manure to land. Appropriate implementation will help reduce complaints of odors.

19. **Avoid spreading when the wind is blowing toward populated areas.**
20. **Avoid spreading on weekends/holidays when people are likely to be engaged in nearby outdoor and recreational activities.**
21. **Spread in the morning when air begins to warm and is rising;~~,~~ rather than in late afternoon.**
22. **Use available weather information to best advantage. Turbulent breezes will dissipate and dilute odors.~~,~~ ~~w~~While hot and humid weather tends to concentrate and intensify odors, particularly in the absence of breezes.**
23. **Take advantage of natural vegetation barriers~~, such as~~(i.e., woodlots or windbreaks)~~,~~ to help filter and dissipate odors.**
24. **Establish vegetated air filters by planting conifers and shrubs as windbreaks. ~~and~~ These windbreaks can be visual screens between cropland and residential developments.**
25. **Incorporate manure into soil during application~~,~~ or as soon as possible after~~,~~ the application. This can be done by ~~(a)~~ soil injection or ~~(b)~~ incorporation within 48 hours after a surface application when weather conditions permit.**

Incorporating manure immediately (i.e., within 48 hours following surface application) will minimize odors and ammonia (NH_3) loss. However, incorporation may not be feasible where manures are applied to pastures or forage crops, (see Section V) or where crop residues are retained for erosion control. Incorporation means the physical

mixing or movement of surface applied manures and other organic byproducts into the soil so that a significant amount of the material is not present on the soil surface. The physical mixing can be done by using minimal disturbance tillage equipment such as aeration tools. Thereby moving surface applied liquid into soils that have void air space not completely filled by soil water. Incorporation also means the soaking of liquid material being applied from the following sources:

a) ~~with i~~Irrigation water,
b) ~~b~~Barnyard manure runoff,
c) ~~l~~Liquid manure,
d) ~~s~~Silage leachate,
e) ~~m~~Milk house wash water, or
f) ~~l~~Liquids from a manure treatment process that separates liquids from solids into the surface soil layer by infiltration~~,~~

~~thereby moving surface applied liquid into soils that have void air space not completely filled by soil water.~~

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Irrigation of manure to land can be an effective land application method for delivering manure to land in a short period of time without the potential damage to soil structure that can occur with other methods. However, the process can be odorous for a short period of time.

Land application of liquid manure through an irrigation system is an acceptable method. Three methods are commonly used:

a) Center pivot spray which offer excellent uniformity of application, minimize compaction, and allow for timely application. ~~,~~
b) ~~c~~Center pivot with drop tubes~~., and~~
c) ~~v~~Volume guns either stationary or movable.

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~~Center pivots offer excellent uniformity of application, minimize compaction, and allow for timely application. Except for pivots with drop tubes, a~~All the irrigation systems have potential for odor release.

If liquid manure is applied through an irrigation system, care should be taken to assure that runoff does not occur due to application rates exceeding the soil infiltration rates. On fractured soils or those with preferential flow paths, care must be taken to assure that manure does not flow into subsurface drains. On systems where the manure is diluted with well or surface water, a check valve assembly must be installed to prevent back flow of manure into the well or surface water source.

Spray irrigation produces aerosol sprays that can be detected for long distances. Wind direction and impact on neighbors need to be observed closely. An alternative to traveling big guns that reduces odor is a boom fitted with drop tubes to place the manure below the plant canopy on the soil surface. Research in Europe has shown this method to be effective in minimizing odors.

IV. CONSTRUCTION DESIGN AND MANAGEMENT FOR MANURE STORAGE AND TREATMENT FACILITIES

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Construction Design

26. Construction design for manure storage and treatment facilities should meet standards and specifications in accordance with NRCS conservation practice standards Waste Storage Facility (313) (USDA-NRCS-MI FOTG). Additional publications that can be used are the Concrete Manure Storages Handbook MWPS-36 (MidWest Plan Service, 1994) and Circular Concrete Manure Tanks publication TR-9 (MidWest Plan Service 1998).

Seepage Control for Earthen Basins

27. To protect groundwater from possible contamination, utilize liners that meet standards and specifications in accordance with NRCS conservation practice standards Waste Storage Facility (313) (USDA-NRCS-MI FOTG). Liners include natural existing soil (Barrington and Jutras, 1985; Barrington *et al*., 1987a, 1987b), bentonite or similar high swell clay materials, compacted earthen liners, and flexible membranes.

Management

28. All manure storage structures shall maintain a minimum freeboard of twelve inches (six inches for fabricated structures) plus the additional storage volume necessary to contain the precipitation and runoff from a 25-year, 24-hour storm event.

When considering total storage volume, include all bedding, storm runoff water, milk house and parlor wastewater~~;~~, and silage leachate that enter the storage structure~~. In addition, manure storage structure integrity should also be maintained by means of periodic inspections.~~ Periodic inspectins of the manure storage structure should be performed to ensure that structural integrity is maintained. During these inspections, identify any item that would minimize integrity, such as animal burrows, trees and shrubs growing on the berm, and low areas in the structure that may be conducive to leakage.

V. MANURE APPLICATION TO LAND

One of the best uses of animal manure is as a fertilizer for crop production. Recycling plant nutrients from the crop to animals and back to the soil for growth of crops again is an age-old tradition. Depending on the species of animal, 70-80 percent of the nitrogen (N), 60-85 percent of the phosphorus (P), and 80-90 percent of the potassium (K) fed to the animals as feed will be excreted in the manure and potentially available for recycling to soils.

Livestock operations can generate large amounts of manure ~~and increase the challenge of recycling manure~~ that is utilized as nutrients for crop production. Good management is the key to ensure that the emphasis is on manure utilization rather than on waste disposal. Utilizing manure nutrients to supply the needs of crops and avoiding excessive loadings achieves two desirable goals. First, efficient use of manure nutrients for crop production will accrue economic benefits by reducing the amounts of commercial fertilizers needed. Second, eliminate water quality concerns for potential contamination of surface waters and groundwater by nutrients, microorganisms and other substances from manure can best be addressed when nutrients are applied at agronomic rates and all GAAMPs for manure applications are followed.

Application of animal manure to fields used for crop production is the predominant form of manure recycling. The ~~T~~three ~~overriding~~ main criteria that need to be considered for every manure application are environmental protection, neighbor relations~~,~~ and nutrient utilization. The manure should be managed in a manner to retain the nutrients in the soil-plant system. The rate and method of application are influenced by soil and weather conditions. For liquid manure~~,~~ the receiving soil needs to have enough air space for timely infiltration. All manure applications need to be managed to control odors and prevent runoff from the cropland where the manure is applied. Nutrient utilization management includes the use of current soil test results, manure nutrient analysis (or book values)~~,~~ and realistic yield goals. Manure applications may provide certain nutrients for multiple years of crop production; ~~and~~ in some cases~~,~~ the additional carbon supplied as organic matter improves the tilth of mineral soils.

The following management practices are suggested for livestock producers to help them achieve the type of management that will accomplish these two goals. However, adverse weather conditions may~~, in part,~~ prevent responsible livestock producers from adhering to these practices for a short duration of time. In addition to effective nutrient management and water quality protection, applying manure to land warrants close attention to management practices so potential odor problems can be minimized or avoided. Section III contains odor control measures, which should be implemented as part of the land application program.

Soil Fertility Testing

29. All fields used for the production of agricultural crops should have soils sampled and tested on a regular basis to determine where manure nutrients can best be utilized.

One goal of a well-managed manure application program is to utilize soil testing and fertilizer recommendations as a guide for applying manures. This will allow as much of the manure nutrients as possible to be used for supplying crop nutrient requirements. Any additional nutrients needed ~~can~~ could be provided by commercial fertilizers. Soil test results will change over time depending on fertilizer and manure additions, precipitation, runoff, leaching, soil erosion, and nutrient removal by crops. Therefore, soil testing should be done once every one to four years.~~, with t~~The frequency of soil sampling dependent on (a) how closely an individual wants to track soil nutrient changes, (b) the crop(s) grown, (c) cropping rotation, (d) soil texture, and (e) the approach used for sampling fields (see MSUE Bulletin E-498S; Warncke and Gehl, 2006 for more details).

Fertilizer Recommendations

30. Use fertilizer recommendations~~,~~ that are consistent with those of Michigan State University, to determine the total nutrient needs for crops to be grown on each field that could have manure applied.

Fertilizer recommendations made by Michigan State University Extension (MSUE) are based on the soil fertility test, soil texture, crop to be grown, a realistic yield goal (average for past 3-5 years), and past crop management. (See Warncke *et al.*, 2004a, 2004b). Fertilizer recommendations can then be utilized by the livestock producer to help identify on which fields manure nutrients will have the greatest value in reducing the amounts of commercial fertilizers needed.~~,~~ This management practice will ~~thereby~~ return~~ing~~ the greatest economic benefit. For additional information, see the current GAAMPs for Nutrient Utilization.

Manure Analysis

31. To determine the nutrient content of manure, analyze it for percent dry matter (solids), ammonium N (NH_4-N), and total N, P, and K.

Several factors which will determine the nutrient content of manures prior to land application are: (a) type of animal species, (b) composition of the feed ration, (c) amount of feed, bedding~~,~~ and~~/or~~ water added to manure, (d) method of manure collection and storage, and (e) climate. Because of the large variation in manure nutrient content due to these factors, it is not advisable to use average nutrient contents provided in publications when determining manure nutrient loadings for crop production. The best way to determine the nutrient content of manure (and provide farm-specific information) is to obtain a representative sample(s) of that manure. ~~and t~~Then have a laboratory analyze the sample(s). In order to establish "baseline" information about the nutrient content of each manure type on the farm, sample and test manures for at least

a two year period. MSUE can provide information on collecting representative manure samples and where to send samples for analysis.

Manure Nutrient Loadings

32. The agronomic (fertilizer) rate of N recommended for crops (consistent with Michigan State University N fertilizer recommendations) should not be exceeded by the amount of available N added, either by manure applied~~,~~ or by manure plus fertilizer N applied, and/or by other N sources. For legume crops~~,~~ the removal value of N may be used as the maximum N rate for manure applications. The available N per ton or per 1000 gallons of manure should be determined by using a manure analysis and the appropriate mineralization factors (see Manure Management Sheet #2, MSUE Bulletin E-2344 by Jacobs *et al*., 1992b). ~~for~~ The mineralization factors consist of the organic N released during the first growing season following application and the three succeeding growing seasons.

Excessive manure applications to soils can: (a) result in excess nitrate-N (NO_3-N) not being used by plants or the soil biology. ~~and~~ This increases the risk of NO_3-N being leached down through the soil and into groundwater; (b) cause P to accumulate in the upper soil profile and increase the risk of contaminating surface waters with P where runoff/erosion occurs; and (c) create nutrient imbalances in soils which may cause poor plant growth or animal nutrition disorders for grazing livestock. The greatest water quality concern from excessive manure loadings~~,~~ (where soil erosion and runoff is controlled)~~,~~ is NO_3-N losses to groundwater. Therefore, the agronomic fertilizer N recommendation (removal value for legumes) should never be exceeded.

The availability of N in manure for plant uptake will not be the same as highly soluble~~,~~ fertilizer N. Therefore, total manure N cannot be substituted for that in fertilizers on a pound-for-pound basis, because a portion of the N is present in manure organic matter which must be decomposed~~,~~ before mineral (inorganic) forms of N are available for plant uptake.

The rate of decomposition (or mineralization) of manure organic matter will be less than 100% during the first year. ~~and~~ This will vary depending on the type of manure and the method of manure handling. Therefore, in order to estimate how much of the total manure N in each ton or 1000 gallons of manure will be available for crops (and a credit against the N fertilizer recommendation)~~,~~ some calculations are needed. The total N and NH_4-N content from the manure analysis can be used with the appropriate mineralization factors to calculate this value. Following are the ~~M~~management tools to assist with these calculations: ~~include~~

(a ~~)~~ Manure Management Sheet #2, MSUE Bulletin E-2344 (Jacobs *et al*., 1992b).~~,~~

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(b) ~~b~~Bulletins MM-2 and MM-3 from the Animal Manure Management Resource Notebook (Jacobs, 1995a, 1995b).~~, or~~

(c~~)~~ -Tthe MSU Nutrient Management (MSUNM) computer program (Jacobs and Go, 2001).

In addition to the amount of plant-available N provided during the first year after a manure application:~~,~~ more N will be released from the residual organic matter not decomposed the first year. This additional decomposition and release of N will occur during the second, third and fourth years. ~~and~~ This should be estimated and included as an N credit against the fertilizer recommendation to avoid excessive N additions to the soil-plant system. At the present time, organic N released (mineralized) during the second, third and fourth cropping years is estimated to be 50 percent, 25 percent, and 12.5 percent, respectively, of the amount released the first year. To assist with the calculations for estimating this carryover N from previous manure applications, the same management tools listed in the preceding paragraph can be used.

33. **If the Bray P1 soil test level for P reaches 150 lb/acre[2] (75 ppm), manure applications should be managed at an agronomic rate where manure P added does not exceed the P removed by the harvested crop. (If this manure rate is impractical due to manure spreading equipment or crop production management, a quantity of manure P equal to the amount of P removed by up to four crop years may be applied during the first crop year. If no additional fertilizer or manure P is applied for the remaining crop years~~,~~ and the rate does not exceed the N fertilizer recommendations for the first crop grown). If the Bray P1 soil test reaches 300 lb/acre[2] (150 ppm) or higher, manure applications should be discontinued until nutrient harvest by crops reduces P test levels to less than 300 lb/acre. To protect surface water quality against discharges of P, adequate soil and water conservation practices should be used to control runoff, erosion and leaching to drain tiles from fields where manure is applied.**

While the availability of N and P in manure may be considerably less than 100 percent.~~,~~ ~~t~~The availability of K in manure is normally considered to be close to 100 percent. Periodic soil testing can be used to monitor the contribution made by P and K to soil fertility levels.~~,~~ ~~b~~But soil tests have not been very effective to determine the amount of N a soil can provide for plant growth.

When manures are applied to supply all the N needs of crops, the P needs of crops will usually be exceeded~~,~~ and soil test levels for P will increase over time. If Bray P1 soil test P levels reach 300 lb/acre[2] (150 ppm), the risk of losing soluble P and sediment-bound P by runoff and erosion (i.e., nonpoint source pollution) increases. Therefore,

[2] If the Mehlich 3 extractant is utilized for the soil fertility test instead of the Bray P1 extractant, then the following equivalent Mehlich 3 soil test levels can be used for Michigan soils: 150 lb P/acre (Bray P1) = 165 lb P/acre (Mehlich 3) and 300 lb P/acre (Bray P1) = 330 lb P/acre (Mehlich 3).

adequate soil and water conservation practices should be implemented to control runoff and erosion ~~should be implemented~~. For example, conservation tillage can enhance infiltration of water into soils, thereby reducing runoff, soil erosion, and associated P loadings to surface waters. Nevertheless, if Bray P1 soil test P levels reach 300 lb/acre, no more manure (or fertilizer) P should be applied until nutrient harvest by crops reduces P test levels to less than 300 lb/acre.

To avoid reaching the 300 lb/acre Bray P1 soil test level, manure application rates should be closely managed. The manure applications only need to fulfill the ~~to provide the~~ P needs of crops rather than providing all of the N needs of crops and adding excess P. Therefore, if the Bray P1 soil test level for P reaches 150 lb/acre[2] (75 ppm)~~,~~ manure applications should be managed at a rate where manure P added does not exceed the P removed by the harvested crop. The quantity of manure P_2O_5[3] that should be added can be estimated from Tables 1 and 2 (Appendix A), using a realistic yield goal for the crop to be grown. For example, if a yield of ~~120~~ 150 bu/acre for corn grain is anticipated, the amount of manure P_2O_5 added to this field should be limited to no more than ~~44~~ 64.5 lb/acre (~~120~~ 150 bu/acre X 0.37 lb P_2O_5/bu nutrient removal rate).

Comment [JP6]: 150 bu/acre is a more current yeild expection. Dr Hilker at MSU predictions are in the 150 bu/acre range.

Up to four crop years of P_2O_5 removal is allowed to be applied as manure P_2O_5 when the Bray P1 soil test is 150-299 lb P/acre. A two to four year crop removal rate of P_2O_5 will accommodate application rates that are more practical for manure spreading equipment. ~~and~~ This is more practical for crop rotations when one crop (e.g., alfalfa) will be grown for two to four years.~~, making manure applications to this crop difficult.~~ For example when alfalfa is grown as a four year crop rotation and there are no manure applications in the first two or three years the plant growth will reduce the soil P levels. An acceptable manure application rate can be calculated using the P_2O_5 content of the manure and the P_2O_5 crop removal (Tables 1 and 2, Appendix A) for the crop(s) to be grown and yields expected for up to four crop years. However, the calculated manure application rate cannot apply more plant-available N (calculated as described above following Practice No. 32) than the amount of the N fertilizer recommendation for the crop to be grown the first year.

Once a suitable manure application rate is calculated, the manure P_2O_5 that is applied becomes a P_2O_5 credit for that field. No additional fertilizer or manure P_2O_5 can be applied to this field until accumulative crop P_2O_5 removal by harvest (Tables 1 and 2, Appendix A) for one or more years has equaled this P_2O_5 credit. Since several fields and different time periods for individual fields may be used for this two to four year P_2O_5 option, a good recordkeeping system tracking these P_2O_5 credits should be used.

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Comment [JP7]: I'm not sure what is ment by "several fields and different time periods for individual fields" this is confusing because you are talking about about a individual fields being several fields.

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Manure Nutrient Loadings on Pasture Land

[3] Fertilizer P recommendations are given in~~, and fertilizer P is~~ (and sold as)~~,~~ pounds of phosphate (P_2O_5)

In pasture systems where the grazed forage is the sole feed source for livestock~~,~~ nutrients from manure deposited by the grazing livestock will not exceed the nutrient requirement of the pasture forage. These types of pasture systems may actually require supplemental nutrient applications to maintain forage quality and growth. Pasture systems utilizing supplemental feed (e.g., swine farrow/finish) often result in manure nutrient deposition in excess of pasture forage requirements. Therefore, nutrient management with rotation to harvested forage or row crops is necessary. Available nutrient deposition should be quantified based on livestock density and nutrient mineralization factors. Manure nutrient loadings should be based on the rotational crop nutrient requirement consistent with those recommended by Michigan State University, as noted above.

Comment [JP8]: Please indicate which section this is refence to. I don't know what is being refenced here.

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Method of Manure Application

34. Manures should be uniformly applied to soils. The amount of manure applied per acre (gallons/acre or tons/acre) should be known, so manure nutrients can be effectively managed.

As is true with fertilizers, lime and pesticides, animal manures should be spread uniformly for best results in crop production. Also, in order to know the quantity of manure nutrients applied, the amount of manure applied must be known. Determining the gallons/acre or tons/acre applied by manure spreading equipment can be accomplished in a variety of ways. One method is to measure the area of land covered by one manure spreader load or one tank wagon of manure. A second method is to record the total number of spreader loads of tank wagons applied to a field of known acreage. With either approach, the capacity of the spreader (in tons) or the tank wagon (in gallons) must be known~~,~~ and some way to vary the rate of application will be needed.~~,~~ For example ~~such as~~ adjusting the speed of travel or changing the discharge settings on the manure spreading equipment. Guidance is available from MSUE to help determine the rates of manure application that a livestock producer's equipment can deliver.

Incorporating manure immediately (i.e., within 48 hours following surface application) will minimize odors and ammonia (NH_3) loss. When manures are surface applied~~,~~ available N can be lost by volatilization of NH_3. These losses will increase with time and temperature. ~~and~~ The loses will be further increased by higher wind speeds and lower humidities. Therefore, injecting manures directly into the soil or immediately incorporating surface-applied manure will minimize NH_3 volatilization losses and provide the greatest N value for crop production. Table 3 (Appendix A) shows potential volatilization losses when manures are applied to the soil and allowed to dry on the surface before incorporation. When dilute effluents from lagoons that contain low solids (<2 percent) are applied/irrigated at rates that do not cause ponding, most of the NH_4-N will likely be absorbed into the soil and retained (see Jacobs, 1995a, 1995b, or Jacobs *et al*., 1992a for additional information). Surface application of manures via irrigation (or

other methods without incorporation) provides alternatives to producers who use a) reduced or no-till soil management, b) supplemental irrigation of crops, or c) application to land with established pasture or other forages, etc.

35. **Manures should not be applied to soils within 150 feet of surface waters or to areas subject to flooding unless: (a) manures are injected or surface-applied with immediate incorporation (i.e., within 48 hours after application) and/or (b) conservation practices are used to protect against runoff and erosion losses to surface waters.**
36. **Liquid manure applications should be managed in a manner to optimize nutrient utilization and not result in ponding, soil erosion losses, or manure runoff to adjacent property, drainage ditches or surface water. Manure applications to crop land with field drainage tiles should be managed in a manner to keep the manure within the root zone of the soil and to prevent manure from reaching tile lines.**

To reduce the risk of runoff/erosion losses of manure nutrients, manures should not be applied and left on the soil surface within 150 feet of surface waters. Manures that are injected or surface applied with immediate incorporation can be closer than 150 feet~~,~~ as long as conservation practices are used to protect against runoff and erosion. A vegetative buffer between the application area and any surface water is a desirable conservation practice. Manure should not be applied to grassed waterways or other areas where there may be a concentration of water flow.~~,~~ ~~u~~Unless it is applied as ~~used to~~ fertilize and/or mulch new seedlings following waterway construction. Manure should not be applied to areas subject to flooding unless injected or immediately incorporated. Liquid manures should not be applied in a manner that will result in ponding or runoff to adjacent property, drainage ditches, or surface water. Therefore, application to saturated soils, such as during or after a rainfall~~,~~ should be avoided.

Manure applications to crop land with field drainage tiles should be managed in a manner that keeps manure from reaching tile lines. Liquid manure has the risk of following preferential flow paths through cracks, worm holes, and other soil macropores to field drainage tiles. Liquid manure can also reach field drainage tiles when soils are saturated. This flow can result in a discharge of manure nutrients and contaminants to surface waters. Risks of manure entering field tile can be reduced by analyzing field conditions prior to land application of liquid manure such as tile location and depth;~~,~~ tile inlets, soil type, evidence of soil cracking and soil moisture holding capacity. Recent precipitation and forecasted precipitation should be considered.

Whenever possible~~,~~ tile outlets should be observed before and after land application. Observations should note the flow rate, color, and odor to confirm that no flow of manure nutrients is occurring. Tile which is flowing prior to land application may be an indication that the soil is saturated. Land application to saturated soils should be avoided. Manure application rates and application methods should be based on field and weather conditions.

Guidance and specific actions can be found in MSU Extension Bulletin WO-1037 (found at www.animalagteam.msu.edu) and in the USDA-NRCS-MI Field Office Technical Guide (USDA-NRCS-MI FOTG). These actions are not a substitute for properly evaluating field and weather conditions as described above.

Field Code Changed

37. As land slopes increase from zero percent~~,~~ the risk of runoff and erosion also increases, particularly for liquid manure. Adequate soil and water conservation practices should be used which will control runoff and erosion for a particular site.~~,~~ ~~t~~Taking into consideration such factors as type of manure, bedding material used, surface residue or vegetative conditions, soil type, slope, etc.

As land slopes increase~~,~~ the risk of runoff and erosion losses to drainage ways, and eventually to surface waters~~,~~ also increases. Soil and water conservation practices should be used to control and minimize the risk of nonpoint source pollution to surface waters~~;,~~ particularly where manures are applied. Injection or surface application of manure with immediate incorporation should generally be used when the land slope is greater than 6 percent. However, a number of factors~~,~~ (~~such as~~i.e., liquid vs. solid or semi-solid manures~~;,~~ rate of application, amount of surface residues, soil texture, drainage, etc.) can influence the degree of runoff and erosion that could pollute surface water. Therefore, adequate soil and water conservation practices to control runoff and erosion at any particular site are more critical than the degree of slope itself.

Timing of Manure Application

38. Where application of manure is necessary in the fall rather than spring or summer, using as many of the following practices as possible will help to minimize potential loss of NO_3-N by leaching: (a) apply to medium or fine rather than to coarse textured soils; (b) delay applications until soil temperatures fall below 50ºF; and/or (c) establish cover crops before or after manure application to help remove NO_3-N by plant uptake.

Ideally, manure (or fertilizer/other source) nutrients should be applied as close as possible to, or during, periods of maximum crop nutrient uptake to minimize nutrient loss from the soil-plant system. Therefore, spring or early summer application is best for conserving nutrients.~~,~~ ~~w~~Whereas fall application generally results in greater losses~~,~~ particularly for nitrogen as NO_3-N on course textured soils (i.e., sands, loamy sands, sandy loams).

39. Application of manure to frozen or snow-covered soils should be avoided, but where necessary, (a) solid manures should only be applied to areas where slopes are six percent or less and (b) liquid manures should only be applied to soils where slopes are

three percent or less. In either situation, provisions must be made to control runoff and erosion with soil and water conservation practices, such as vegetative buffer strips between surface waters and soils where manure is applied.

Winter application of manure is the least desirable in terms of nutrient utilization and prevention of nonpoint source pollution. Frozen soils and snow cover will limit nutrient movement into the soil. ~~and~~ Frozen soils greatly increase the risk of manure being lost to surface waters by runoff and erosion during thaws or early spring rains. When winter application is necessary, appropriately-sized buffer strips should be established and maintained between surface waters and frozen soils where manure is applied. ~~to~~These buffers strips will help minimize any runoff and erosion of manure from reaching surface waters. Particular attention to field slopes, manure application rates~~,~~ and fields with surface water inlets can help prevent runoff and erosion from frozen and/or snow covered soils where manure is applied.

A field-specific assessment, such as the NRCS Manure Application Risk Index (MARI) (USDA-NRCS, 1999 National Agronomy Manual) will help evaluate the risk for runoff losses. A spreadsheet for using the MARI can be found at http://www.maeap.org

Field Code Changed

Management of Manure Applications to Land

40. Records should be kept of manure analyses, soil test reports, and rates of manure application for individual fields.

Good record keeping demonstrates good management and will be beneficial for the producer.

Records should include manure analysis reports and the following information for individual fields:

a. soil fertility test reports;
b. date(s) of manure application(s);
c. rate of manure applied (e.g., gallons or wet tons per acre);
d. previous crops grown on the field; and
e. yields of past harvested crops.

Summary

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An important ingredient of a successful program for managing the animal manure generated by a livestock operation is "planning ahead". An early step of a manure application plan is to determine whether enough acres of cropland are available for utilizing manure nutrients without resulting in excess nutrient application to soils.

Using Table 4 of these GAAMPs or calculating nutrients excreted based on feed rations (such as worksheet 1. Total manure nutrients excreted by a livestock operation based on using feed rations, MWPs-18, 2000) can help in making preliminary estimates of manure quantities and manure nutrients produced by different types of livestock. Table five can provide further guidance regarding N losses that can occur during handling and storage or manures before they are applied. This information can be used to compare the quantity of available manure nutrients against the quantity of nutrients removed by the crops to be grown in the livestock operation. Manure Management Sheet #1, MSUE Bulletin E-2344 (Jacobs *et al*., 1992b), and the MSUNM computer program (Jacobs and Go, 2001) can assist with this type of inventory. If the quantity of manure nutrients being generated greatly exceeds the annual crop nutrient needs, then alternative methods for manure utilization should be identified. For example, cooperative agreements with neighboring landowners to provide additional land areas to receive and properly utilize all of the manure nutrients may be necessary.

Another consideration is to use good judgment when planning manure applications in conjunction with normal weather patterns;~~,~~ the availability of land at different times during the growing season for different crops, and the availability of manpower and equipment relative to other activities on the farm which compete for these resources. Having adequate storage capacity to temporarily hold manures can add flexibility to a management plan when unanticipated weather occurs.~~,~~ This storage can prevent~~ing~~ untimely applications. Nevertheless, unusual weather conditions do occur and can create problems for the best of management plans.

Finally, good recordkeeping is the foundation of a good management plan. Past manure analysis results will be good predictors of the nutrient content in manures being produced and applied today. Records of past manure application rates for individual fields will be helpful for estimating the amount of residual N that will be available for crops to use this coming growing season. Changes in the P test levels of soils with time~~,~~ (due to manure P additions)~~,~~ can be determined from good records.~~,~~ ~~and t~~That information can be helpful in anticipating where manure rates may need to be reduced and when additional land areas may be needed. Recordkeeping systems, such as that described in MSUE Bulletin E-2340 (Jacobs *et al*., 1992a) or available as a microcomputer program called MSUNM (Jacobs and Go, 2001), may be helpful in accomplishing this goal. The Nutrient Management program can easily calculate manure application rates for individual fields that will follow the nutrient application criteria recommended in these manure management GAAMPs.

VI. APPENDICES

APPENDIX A

Tables

Table 1. Approximate nutrient removal (lb/unit of yield) in the harvested portion of several Michigan field crops.[4]

Crop		Unit	N	P_2O_5	K_2O
			- - - - lb per unit - - - -		
Alfalfa	Hay	ton	45[5]	13	50
	Haylage	ton	14	4.2	12
Barley	Grain	bushel	0.88	0.38	0.25
	Straw	ton	13	3.2	52
Beans (dry edible)	Grain	cwt	3.6	1.2	1.6
Bromegrass	Hay	ton	33	13	51
Buckwheat	Grain	bushel	1.7	0.25	0.25
Canola	Grain	bushel	1.9	0.91	0.46
	Straw	ton	15	5.3	25
Clover	Hay	ton	40[2]	10	40
Clover-grass	Hay	ton	41	13	39
Corn	Grain	bushel	0.90	0.37	0.27
	Grain[6]	ton	26	12	6.5
	Stover	ton	22	8.2	32
	Silage	ton	9.4	3.3	8.0
Millet	Grain	bushel	1.1	0.25	0.25
Oats	Grain	bushel	0.62	0.25	0.19
	Straw	ton	13	2.8	57
Orchardgrass	Hay	ton	50	17	62
Potatoes	Tubers	cwt	0.33	0.13	0.63
Rye	Grain	bushel	1.1	0.41	0.31
	Straw	ton	8.6	3.7	21
	Silage	ton	3.5	1.5	5.2
Sorghum	Grain	bushel	1.1	0.39	0.39
Sorghum-Sudangrass	Hay	ton	40	15	58
(Sudax)	Haylage	ton	12	4.6	18
Soybeans	Grain	bushel	3.8	0.80	1.4
Spelts	Grain	bushel	1.2	0.38	0.25
Sugar Beets	Roots	ton	4.0	1.3	3.3
Sunflower	Grain	bushel	2.5	1.2	1.6
Timothy	Hay	ton	45	17	62
Trefoil	Hay	ton	48[2]	12	42

[4] Source: Nutrient Recommendations for Field Crops in Michigan. *(Warncke et al., 2004a)*
[5] Legumes get most of their nitrogen from air.
[6] High moisture grain.

Wheat	Grain	bushel	1.2	0.63	0.37
	Straw	ton	13	3.3	23

Table 2. Approximate nutrient removal (lb/unit of yield) in the harvested portion of several Michigan vegetable crops.[7]

Crop[8]	N	P_2O_5	K_2O
	---- lb/ton[9] ----		
Asparagus crowns, new planting, or established	**13.4**	**4.0**	**10**
Beans, snap	**24**	**2.4**	**11**
Beets, red	**3.5**	**2.2**	**7.8**
Broccoli	**4.0**	**1.1**	**11**
Brussels Sprouts	**9.4**	**3.2**	**9.4**
Cabbage, fresh market, processing, or Chinese	**7.0**	**1.6**	**6.8**
Carrots, fresh market or processing	**3.4**	**1.8**	**6.8**
Cauliflower	**6.6**	**2.6**	**6.6**
Celeriac	**4.0**	**2.6**	**6.6**
Celery, fresh market or processing	**5.0**	**2.0**	**11.6**
Cucumbers, pickling (hand or machine harvested)	**2.0**	**1.2**	**3.6**
Cucumber, slicers	**2.0**	**1.2**	**3.6**
Dill	**3.5**	**1.2**	**3.6**
Eggplant	**4.5**	**1.6**	**5.3**
Endive	**4.8**	**1.2**	**7.5**
Escarole	**4.8**	**1.2**	**7.5**
Garden, home	**6.5**	**2.8**	**5.6**
Garlic	**5.0**	**2.8**	**5.6**
Ginseng	**4.6**	**1.2**	**4.6**
Greens, Leafy	**4.8**	**2.0**	**6.0**
Horseradish	**3.4**	**0.8**	**6.0**
Kohlrabi	**6.0**	**2.6**	**6.6**
Leek	**4.0**	**2.6**	**4.8**
Lettuce, Boston, bib	**4.8**	**2.0**	**9.0**
Lettuce, leaf, head, or Romaine	**4.8**	**2.0**	**9.0**

[7] Source: Nutrient Recommendations for Vegetable Crops in Michigan. (*Warncke, et.al., 2004b*)

[8] Values used for some crops are estimates based on information for similar crops.

[9] 1 ton = 20 cwt.

Crop[8]	N	P_2O_5	K_2O
	---- lb/ton[9] ----		
Market Garden	6.5	2.8	5.6
Muskmelon	8.4	2.0	11
Onions, dry bulb or green	5.0	2.6	4.8
Pak Choi	7.0	1.6	6.8
Parsley	4.8	1.8	12.9
Parsnip	3.4	3.2	9.0
Peas	20	4.6	10
Peppers, bell, banana, or hot	4.0	1.4	5.6
Pumpkins	4.0	1.2	6.8
Radish	3.0	0.8	5.6
Rhubarb	3.5	0.6	6.9
Rutabagas	3.4	2.6	8.1
Spinach	10	2.7	12
Squash, hard Squash, summer	4.0 3.6	2.2 2.2	6.6 6.6
Sweet Corn	8.4	2.8	5.6
Sweet potato	5.3	2.4	12.7
Swiss Chard	3.5	1.2	9.1
Tomatoes, fresh market or processing	4.0	0.8	7.0
Turnip	3.4	1.2	4.6
Watermelon	4.8	0.4	2.4
Zucchini	4.6	1.6	6.6

[8] Values used for some crops are estimates based on information for similar crops.

[9] 1 ton = 20 cwt.

Table 3. Ammonium nitrogen volatilization losses for surface application of solid and semi-solid manures.[10]

Days Before Incorporation	Retention Factor (RF)	Loss Factor (LF)
0-1 day	0.70	0.30
2-3 days	0.40	0.60
4-7 days	0.20	0.80
>7 days	0.10	0.90

Table 4. Manure and manure nutrients produced by different livestock species.[11]

Animal Species	Type and Average Size[12] (lb)		Production (per day)[13]			
			Manure(ft^3)	Nutrients (lb)		
				N	P_2O_5	K_2O
Dairy Cattle		150	0.2	0.05	0.01	0.04
		250	0.32	0.08	0.02	0.07
	Heifer	750	1.0	0.23	0.07	0.22
	Lactating Cow	1,000	1.7	0.58	0.30	0.31
		1,400	2.4	0.82	0.42	0.48
	Dry Cow	1,000	1.30	0.36	0.11	0.28
		1,400	1.82	0.50	0.20	0.40
	Veal	250	0.14	0.04	0.03	0.06
Beef Cattle	Calf	450	0.42	0.14	0.10	0.11
	High Forage	750	1.0	0.41	0.14	0.25
	High Forage	1,100	1.4	0.61	0.21	0.36
	High Energy	750	0.87	0.38	0.14	0.22
	High Energy	1,100	1.26	0.54	0.21	0.32
	Cow	1,000	1.00	0.31	0.19	0.26
Swine	Nursery Pig	25	0.04	0.02	0.01	0.01
	Grow-Finish	150	0.15	0.08	0.05	0.04
	Gestating	275	0.12	0.05	0.04	0.04
	Lactating	375	0.36	0.18	0.13	0.14
	Boar	350	0.12	0.05	0.04	0.04
Sheep		100	0.06	0.04	0.02	0.04
Horse		1,000	0.8	0.28	0.11	0.23
Poultry (per 100 birds)	Chicken Layers	4	00.4	0.35	0.27	0.16
	Chicken Broilers	2	00.3	0.23	0.14	0.11
	Turkey[2]	20	01.4	1.26	1.08	0.54

[10] Source: Recordkeeping System for Crop Production. *(Jacobs et al., 1992a)*

[11] Source: Manure Characteristics, MWPS-18, Table 6 (*MidWest Plan Service, 2000*).

[12] Weights represent the average size of the animal during the stage of production.

[13] Note: Values are as-produced estimations and do not reflect any treatment. Values do not include bedding. The actual characteristics of manure can vary +/- 30 percent from the table values. Increase solids and nutrients by 4 percent for each 1 percent feed wasted above 5 percent.

	Duck	6	00.5	0.46	0.38	0.28

Table 5. Nitrogen losses during handling and storage.[14]

Manure Type	Handling System	Nitrogen Lost (percent)
Solid	Daily scrape & haul	20-35
	Manure pack	20-40
	Open lot	40-55
	Deep pit (poultry)	25-50
	Litter	25-50
Liquid	Anaerobic pit	15-30
	Above-ground	10-30
	Earth Storage	20-40
	Lagoon	70-85

[14] Source: Livestock Waste Facilities Handbook. (*MidWest Plan Service, 1993*).

Table 6. Michigan 25-Year, 24-Hour Precipitation by County[15]

County	Precipitation (inches)	County	Precipitation (inches)
Alcona	3.60	Lake	4.48
Alger	3.87	Lapeer	3.60
Allegan	4.45	Leelanau	3.89
Alpena	3.60	Lenawee	3.60
Antrim	3.89	Livingston	3.60
Arenac	3.56	Luce	3.87
Baraga	4.17	Mackinac	3.87
Barry	4.09	Macomb	3.60
Bay	3.56	Manistee	3.89
Benzie	3.89	Marquette	4.17
Berrien	4.45	Mason	4.48
Branch	4.09	Mecosta	4.15
Calhoun	4.09	Menominee	4.17
Cass	4.45	Midland	4.15
Charlevoix	3.89	Missaukee	3.89
Cheboygan	3.60	Monroe	3.60
Chippewa	3.87	Montcalm	4.15
Clare	4.15	Montmorency	3.60
Clinton	4.09	Muskegon	4.48
Crawford	3.60	Newaygo	4.48
Delta	3.87	Oakland	3.60
Dickinson	4.17	Oceana	4.48
Eaton	4.09	Ogemaw	3.60
Emmet	3.89	Ontonagon	4.17
Genesee	3.60	Osceola	4.15
Gladwin	4.15	Oscoda	3.60
Gogebic	4.17	Otsego	3.60
Grand Traverse	3.89	Ottawa	4.45
Gratiot	4.15	Presque Isle	3.60
Hillsdale	4.09	Roscommon	3.60
Houghton	4.17	Saginaw	3.56
Huron	3.56	Sanilac	3.56
Ingham	4.09	Schoolcraft	3.87
Ionia	4.09	Shiawassee	4.09
Iosco	3.60	St Clair	3.60
Iron	4.17	St Joseph	4.09
Isabella	4.15	Tuscola	3.56
Jackson	4.09	Van Buren	4.45
Kalamazoo	4.45	Washtenaw	3.60
Kalkaska	3.89	Wayne	3.60
Kent	4.45	Wexford	3.89
Keweenaw	4.17		

[15] Source: Rainfall Frequency atlas of the MidWest (Huff and Angel, 1992).

APPENDIX B

Manure and Nutrient Management Plans

Manure and nutrient management plans are management tools that provide detailed information about your farm and any operations dealing with the farm regarding the GAAMPs previously discussed. Every farm should have a plan~~,~~ and one may be needed to determine conformance to the GAAMPs~~;,~~ especially if a complaint is registered with the MDA's complaint response program.

Manure Management System Plan

A manure management system plan (MMSP) focuses on two subject areas: (1) management of manure nutrients and (2) the management of manure and odor. The most critical aspects of a MMSP is to ensure that a livestock operation remains environmentally sustainable ~~is~~ and to determine the quantity of manure nutrients (nitrogen, phosphate, and potash) that ~~is~~ are being generated by the operation. Then ~~you must~~ it needs to be determined how these nutrients can be utilized in accordance with the aforementioned GAAMPs. Nutrients can be utilized ~~either~~ on the livestock farm or transported off the farm for utilization elsewhere. Good management of manure nutrients for crop uptake and nutrient utilization will help prevent loss of nutrients into surface water and groundwater resources.

A MMSP will include most~~,~~ (but probably not all)~~,~~ of the following components:

1. Production refers to the amount of volume of manure and any other agricultural by-products produced and the associated nutrient content. Examples include total manure produced, silage leachate, milk house wastewater, and/or rainwater that flow through the barnyard.
2. Collection refers to how manure and any other by-products will be gathered for management. This includes collection points, method and scheduling of collection, and structural facilities needed. Examples include: solid stacking, a scraping system, a flushing system, slotted floors, etc.
3. Transfer occurs throughout the system and may take different forms at different steps in the system. Transfer includes movement between production and collection points, storage facilities, treatment facilities~~,~~ and land application. The plan may specify the method, distance, frequency, and equipment needs for transfer.
4. If storage facilities are part of the system~~,~~ the type of storage device should be described (e.g., underground concrete tank, solid manure stack, earthen basin). The plan should include the intended storage time, storage volume, shape and dimensions, and site location.
5. Treatment of manure and any other by-products may occur either before or after storage.~~,~~ This depends~~ing~~ on the system~~,~~ and can ~~be~~ consist of physical, biological, and/or chemical treatments. Common forms of treatment include solids separation,

anaerobic and aerobic lagoons, composting and methane digesters. Treatment usually involves more intensive management and may require specialized equipment.~~,~~ ~~b~~But, it is not a necessary component for all systems.

6. Utilization refers to the end-use of the manure and other livestock operation by-products. A use needs to be identified for the full quantity of manure and other by-products~~,~~ as described in the "production" section. For most livestock operations;~~,~~ manure and other by-products are used as a nutrient source for crops. Soil test information, manure and by-product nutrient content;~~,~~ crops to be grown, realistic yield goals~~,~~ and availability of crop fields are key elements in scheduling land applications ~~and~~ to utilize~~ing~~ manure and other by-products for nutrients. Other end-use~~s~~ may include~~,~~ (but are not limited to)~~,~~ being used as a feed supplement, ~~and~~ used as ~~of~~ composted manure ~~as a~~ for mulch, soil amendment, or as bedding material.
7. Recordkeeping plays a critical role in helping make decisions that lead to effective environmental protection and beneficial use of manure related materials. Records also play a critical role in documenting, communicating~~,~~ and assessing sound manure management practices. ~~that~~ These practices can help assure the general public that the environment is being protected.
8. Odor management practices that reduce the frequency, intensity, duration~~,~~ and offensiveness of odors may be included in any of the above steps. Air quality is an important factor when considering neighbor relations and environmental impacts.

A MMSP that accurately and completely describes the current physical system, ~~and~~ the associated management practices~~, along with~~ that include records that document implementation of the plan, that demonstrate responsible management. For additional assistance on developing a MMSP~~,~~ contact Michigan State University Extension, USDA Natural Resources Conservation Service, Conservation Districts, or a private consultant.

Comprehensive Nutrient Management Plan

A comprehensive nutrient management plan (CNMP) is the next step beyond a MMSP. All efforts put towards a MMSP may be utilized in the development of a CNMP.~~,~~ ~~as it is~~ The CNMP is founded on the same eight components as the MMSP~~,~~ with a few significant differences. Some of the "optional" sub-components of a MMSP are required in a CNMP. Examples include veterinary waste disposal and mortality management. In addition, the "production" component is more detailed regarding items such as rainwater, plate cooler water~~,~~ and milk house wastewater. More thorough calculations are also needed to document animal manure and by-product production.

Another difference between a MMSP and a CNMP is in the "utilization" component. With a MMSP~~,~~ nutrients need to be applied at agronomic rates and according to realistic yield goals. However, with a CNMP~~,~~ a more extensive analysis of field application is conducted. This analysis includes the use of the Manure Application Risk Index (MARI)

to determine suitability for winter spreading~~,~~ ~~and~~ the Revised Universal Soil Loss Equation (RUSLE) to determine potential nutrient loss from erosive forces~~,~~ and other farm specific conservation practices. More detail regarding the timing and method of manure applications. ~~and~~ A long term cropping system/plans must be documented in a CNMP.

Additional information ~~on~~ is included about potential adverse impacts to surface and groundwater and preventative measures to protect these resources are identified in a CNMP. Although the CNMP provides the framework for consistent documentation of a number of practices;~~,~~ the CNMP is a planning tool not a documentation package.

Odor management is included in both the MMSP and CNMP.

Implementation of a MMSP is ongoing. A CNMP Implementation Schedule typically includes long-term change. These often include installation of new structures and/or changes in farm management practices that are usually phased in over a longer period of time. Such changes are outlined in the CNMP Implementation Schedule.~~,~~ This schedule provides~~ing~~ a reference to the producer for planning to implement changes within their own constraints.

As is described above~~,~~ a producer with a sound MMSP is well on ~~his/her~~their way to developing a CNMP. Time spent developing and using a MMSP will help position the producer to ultimately develop a CNMP on their farm;~~,~~ if they decide to proceed to that level or when they are required to do so.

WHO NEEDS A CNMP?

1. Some livestock production facilities receiving technical and/or financial assistance through USDA-NRCS Farm Bill program contracts.
2. A livestock production facility in the following situations:~~that~~
   a) ~~a~~Applies for coverage with the MDEQ's National Pollutant Discharge Elimination System (NPDES) permit, or
   b) ~~i~~Is directed by MDEQ on a case by case basis.
3. A livestock farm that is required to have a CNMP as a result of NPDES permit coverage that desires third party verification in the MDA's Michigan Agriculture Environmental Assurance Program (MAEAP) Livestock System verification.

For additional information regarding MAEAP, go to: www.maeap.org or telephone 517-373-9797.

For additional information regarding the permit, go to: www.michigan.gov/deq.

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APPENDIX C

Sample Manure Management System Plan (MMSP)

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I. General Overview

Dairy farm is currently a partnership between a farmer and his two sons. The dairy currently has 150 head of cows in the milking herd and approximately 100 replacement stock on the farm (one animal unit equals 1,000 pounds)~~,~~ which includes lactating and dry cows, replacement heifers and calves. The land base of the operation is approximately 1,275 acres. Crops grown on the farm are corn grain, corn silage, wheat, and alfalfa. The purpose of this plan is to indicate how manure produced on the farm is managed to meet the current Michigan Right-To-Farm management practices~~,~~ (while utilizing the nutrients for crop production)~~,~~ without causing any adverse environmental impacts. Currently, there are no plans of any future expansion of the operation.

Soil testing is being done on the crop fields to have current soil tests on hand. Soil testing will be done on any field~~,~~ which does not have a current soil test (no more than three years old). Manure testing is planned for the spring of 2010 to obtain nutrient levels of the manure. Manure tests will be done at least three times during the first year to establish a base line and then at least once a year thereafter, or more often if feed rations or bedding types and quantities are changed.

II. Volume and Nutrient Production From All Sources

Table 1. Estimated Annual Volume and Nutrient Production From All Sources

Name of Manure Storage	**Numbers of Animals (Size)**	**Consistency/ Contents**	**Estimated Annual Manure and Nutrient Production** (values rounded)			
			Volume* (cu.ft)	**Total N[16] (lbs)**	**P_2O_5**	**K_2O (lbs)**
Free Stall Barn	150 (1,400 lb)	Liquid/Sand	131,000	44,900	23,000	26,300
Loafing Barn	50 (250 lb)	Solid/Straw	5,840	1,460	360	1,280
Calf Barn	25 (150 lb)	Solid/Straw	1820	460	90	360
Open Heifers	25 (750 lb)	Solid/Straw	9,120	2,100	640	2,010
Totals			148,000	48,900	24,100	30,000

*These volumes do not include bedding. (If manure storage facilities are to be built~~,~~ the volume of bedding that will be included with the stored manure will need to be determined in order to size the storage appropriately.)

[16] The nitrogen value does not include any nitrogen losses from storage, handling or land applications.

The manure produced is currently scraped daily and hauled from the free stall barn and parlor. The heifer barns, calf barn, and loafing barn are dry packed for up to one month and if needed sometimes two months~~, if needed,~~ due to weather conditions. See the attachments for the locations of manure storage and animal numbers per barn.

Straw bedding in the additional barns is also hauled to the fields with the manure when the barns are cleaned. Any spoiled feed is hauled and spread on crop fields.

III. Manure Collection

The free stall barn is scraped and hauled daily. This manure is scraped to a ramp where the manure spreader is parked below for loading. The milkhouse wastewater and parlor washwater are collected in an earthen structure south of the parlor. Any manure in the parlor is scraped away prior to flushing with clean water. The flush water is also collected in the earthen structure.

The manure from the young stock is dry packed in the corresponding barns (see attachment). All manure is under cover of the barns so polluted runoff is not a concern from the housed animals. The feed lot could be a potential source of polluted runoff.~~,~~ ~~b~~But, any runoff will be contained on the farm and not allowed to move off site.

IV. Manure Storage

The heifer barn is 30 ft. x 50 ft., the calf barn is 28 ft. x 48 ft., and the loafing barn is 62 ft. x 100 ft. The dry pack will vary from one to two feet in depth, depending on the spreading schedule. This allows for at least two months storage of manure.

There currently are no plans for additional storage facilities or expansion within the near future.

V. Manure Treatment

There currently is no additional treatment of manure.

VI. Manure Transfer and Application

The manure spreader used is a John Deere 785 Hydra Push Back. The box capacity is 243 cu. ft. or 1,818 gallons. This spreader is used for both liquid and solid manure.

The manure from the free stall barn is scraped from the barn down a ramp. The manure spreader is parked below the ramp~~,~~ and the manure is scraped directly into the box. A front-end loader is used to load the spreader with the dry packed manure from the young stock barns.

Manure is typically applied during the summer after wheat, in the fall after corn harvest, through the winter as needed~~,~~ and in the spring just before planting. Manure~~,~~ which is spread during the winter, is applied only to fields with slopes no greater than 6%. A 150 feet setback from surface water will be followed when spreading manure. Manure is incorporated within 48 hours after application in the summer. The Manure Application Risk Index (MARI) will be done on all fields which will be subject to winter spreading.~~,~~ The MARI is completed in order to assess the potential for polluted runoff. Manure is transported from 1/4 to 1 1/2 miles from the headquarters. Most fields are located directly adjacent to the headquarters.

The manure spreader has not been calibrated in the past.~~, b~~But it has been planned for the summer of 2002. The Groundwater Stewardship Technician from MSU Extension is available to assist in calibrating the manure spreader.

VII. Manure Utilization

Table 2. Estimated Annual Farm Nutrient Balance for Fields Receiving Manure

Crop Grown	Yield Goal	Acres (Typical Year)	Nitrogen (lbs)	Estimated Crop Nutrient Removal	
				P_2O_5 (lbs)	K_2O (lbs)
Corn	125 bu.	580	83,500	26,825	19,575
Corn Silage	20 tons	70	13,160	5,040	10,920
Alfalfa Haylage	20 tons	150	21,000	4,800	23,400
Alfalfa Hay	10 tons	150	21,000	4,800	23,400
Wheat	50 bu.	100	4,000	3,100	1,900
Totals		1050	~~142,680~~ 142,660	44,565	79,195
Annual nutrient production from Table 1(values rounded)			~~45,920~~ 48,900	~~20,656~~ 24,100	~~30,918~~ 30,000
Nutrients needed to balance cropping system			~~96,760~~ 93,760	~~23,909~~ 20,465	~~48,277~~ 49,195

The manure nutrients will be utilized as fertilizer in the production of the field crops. The manure will provide approximately ~~45,920~~ 48,900 lbs. of nitrogen (which does not include any N losses due to storage, handling or land application), ~~20,656~~ 24,100 lbs. of P_2O_5 and ~~30,918~~ 30,000 lbs. of K_2O annually. The manure will be land applied after the harvesting of the crops, ~~and~~ in the spring before planting~~,~~ and with daily spreading throughout the year.

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The crop rotation will be a corn, hay, and wheat rotation. Refer to Table 2 for realistic crop goals and acres planted during a typical year. The soils on this farm are loamy sands and sandy loams with clay loam inclusions. The slopes on these fields run from 2% to 10%.

To help determine rates of manure that can be applied to individual fields, a list of fields is included showing the average Bray P1 soil test levels in Table 3. The fields have been grouped by those fields having Bray P1 lest levels <150 lb P/ac, 150-299 lb P/ac, and ≥300 lb P/ac. Fields having <150 lb P/ac will usually have manure applied to provide all of the N recommended for the crop and yield to be grown. To be in compliance with the Right To Farm GAAMPs~~,~~ fields having soil test levels of 150-299 lb P/ac will receive manure P_2O_5 loadings equal to the P_2O_5 expected to be removed by the harvested crop~~,~~ ~~and~~ fields with soil tests ≥300 lb P/ac will not receive any manure (currently, 225 of 1,275 acres will not be receiving manure applications.

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Table 3~~:~~ Field Identification Bray P1 Soil Test Results and Crops Grown

Field Number	Acres	Bray P1 (lbs./ac.)	2010 Crop	2009 Crop
Fields with Bray P1 soil test levels <150 lb P/ac				
7	40	114	Corn	Corn
8	80	102	Corn	Corn
5	160	97	Corn	Corn
6	150	132	Alfalfa Hay	Corn
13	150	128	Alfalfa Hay	Corn
4	100	142	Wheat	Corn Silage
Fields with Bray P1 soil test levels 150-299 lb P/ac				
2	60	192	Corn	Corn
9	80	246	Corn	Alfalfa Hay
10	70	178	Corn Silage	Wheat
12	160	163	Corn	Alfalfa Hay
Fields with Bray P1 soil test levels ≥300 lb P/ac				
1	75	354	Corn	Alfalfa Hay
11	110	315	Corn Silage	Corn Silage
3	40	456	Corn	Alfalfa Hay

VIII. Manure Recordkeeping System

Yearly records will be kept on the following:

- Soil test results (three years old or less) on all fields where manure will be applied;
- Manure analysis (most recent);
- Manure and fertilizer spreading by field (where, when, how much, weather conditions, etc.);
- Crops grown and yield data;
- Date of spreader calibration; and

- Cropping plan.

These records will be kept in a three-ring binder located at the farm headquarters.

IX. Odor Control Plan

Odors from manure applications will be controlled by using the following practices:

- Spreading during times when neighbors may be spending time outside, such as on holidays or weekends will be avoided.
- Spreading will be avoided as much as possible during hot humid days when the air is heavy and still ~~will be avoided as much as possible~~.
- Manure will be incorporated immediately or at least within 48 hours of application, unless being applied to alfalfa.

Odors from the facility will be controlled by using the following practices:

- Install visual screen via tree lines or fence rows to contain odors and reduce complaints from neighbors.
- Clean water will be diverted to help keep the facility dry.
- A cover will be kept on the silage or it will be kept in “Ag Bags”.

THE FOLLOWING ITEMS ARE OPTIONAL~~,~~ BUT ARE STILL GOOD IDEAS TO INCLUDE IN YOUR PLAN:

X. Community Relations

To develop and maintain a positive relationship with the entire community~~,~~ one or more of the following should be considered:

- Keeping the farmstead area esthetically pleasing should be a high priority.
- Each spring, a farm newsletter could be sent to all appropriate community members describing farm activities, personnel~~,~~ and management.
- A community picnic and farm tour could be held once a year for all in the immediate community and manure application areas.
- Your farm could be made available to local schools for farm visits as field trips or school projects.
- Participate in local community such as a local town festival, parade, etc., where there is an opportunity to do so.
- Communicate with your neighbors before and after applying manure near their respective homes.

XI. Emergency Manure Spill Plan

Points that should be covered:

- □ Detailed procedure to be used in the event of a spill, e.g., listing contact people and notification phone numbers;
- □ Include the Michigan Department of Agriculture & Rural Development Ag Pollution Hotline (800)-405-0101;
- □ Plan for spills that might happen at various places including a breach of the storage structure, at loading, during transport, and in the field;
- □ A large part of the Manure Spill Plan should have to do with prevention and monitoring, e.g., maintaining a minimum freeboard in your manure storage to prevent overflows, mowing manure storage berms and inspecting for burrowing animal activity periodically to prevent manure releases; and
- □ Include a farm map showing all structures at the farmstead.

XII. Veterinary Waste Disposal

Explain how veterinary waste will be disposed of by the attending veterinarian:~~, e.g.,~~

- □ Any veterinary waste generated from farm medicating will be disposed of by having it picked up by a sanitary waste disposal company (residential trash removal).
- □ Any sharps (e.g. needles) will be placed in a closed container (such as an empty plastic bleach bottle, water bottle, juice bottle, etc.) to prevent needle pricks from occurring to any potential handler of the waste.

XIII. Mortality Disposal

Explain how dead animals will be handled:~~, e.g.,~~

- □ Dead animals will be picked up by a rendering service within 24 hours.
- □ If animals are going to be buried, the Michigan Bodies of Dead Animals Act will be consulted for proper burial procedures.

XIV. Conservation Plan

Points that should be covered:

- □ Farm field soil conservation measures being used, such as conservation tillage, no till, and grass filter strips;
- □ Storm water runoff control measures, such as berms, retention basins, and infiltration strips;
- □ Runoff from driveways, silo aprons, and open feed lots; and
- □ Measures used to keep clean roof runoff out of manure.

This Manure Management System Plan was prepared by:

_____

_____

_____

Date the plan was completed:

_____

mm/dd/yyyy

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REVIEW COMMITTEE

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Casteel, Heather (MDA)

From: Janet Kauffman <jkauffman@emich.edu>
Sent: Friday, August 17, 2012 9:16 AM
To: Casteel, Heather (MDA)
Cc: Dale Rozeboom; Wendy Powers-Schilling
Subject: Manure/Siting GAAMPs comments

Comments for: Manure Management GAAMPs
Site Selection/Odor Control GAAMPs

The GAAMPs committees have not yet grappled with the agricultural practices that put Michigan's waterways and air and communities at greatest risk. In spite of major efforts at the national level to clean up the Great Lakes, and all the evidence pointing to agriculture as the principal source of excess nutrients, the GAAMPs committees made NO changes in manure practices. The only changes made were in the committee lists, offices, and phone numbers, and correction of one typo! In the Site Selection/Odor Control GAAMPs, zoning notes were added and one sentence in Appendix B under "Example: Dairy Odor Management Plan" in the sub-section Community Relations: "*Notify potentially impacted neighboring residences at least 24 hours in advance of manure application.*" Those are not substantive changes in practices.

Manure Management GAAMPs Committee must, sooner or later, address these highest-risk practices:

• liquid manure application on frozen or snow-covered fields. Where there is no crop to absorb nutrients. Where vegetated buffers (frozen or snow-covered) do not stop the flow of waste in sunlight or thaw.

• the application of liquid manure on tile-drained fields. Most immediately, the risk of liquid manure on tile-drained fields in Michigan's Impaired watersheds. (a USGS study of tile water in Lime/Bean Creek watershed showed ALL water samples had excess nutrients)

Site Selection/Odor Control GAAMPs Committee must, sooner or later, address the social considerations (one of GAAMPs' primary objectives) and the environmental justice issue of –

• setbacks from neighbors. As the GAAMPs note in Category 3, setback for migrant labor housing must be at least 500 ft, for new or expanding operations, no matter the size. Why isn't the

health of year-round neighbors and migrant laborers treated the same? 500 ft should be the minimum setback from all residences for new or expanding operations.

Sincerely,

Janet Kauffman
Hudson, MI

Janet Kauffman, Vice-President
Environmentally Concerned Citizens of South Central Michigan
Hudson, MI

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(4)

Casteel, Heather (MDA)

From: Jerry Rohde <jerry@wheelertownship.com>
Sent: Tuesday, August 14, 2012 11:33 AM
To: Casteel, Heather (MDA)
Cc: bgoward@isabellabank.com; patriciag8@frontier.com; sharon@wheelertownship.com; wheelertwp@ispmgt.com
Subject: GAAMPS Regulations

I am writing in regards to the upcoming GAAMPs review that will be discussed in your August 22nd meeting for livestock production facilities and irrigation wells.

My feeling is that the local Townships do not have enough say as to where and how many of either of these facilities go. As for the livestock production facilities our Township does require a Special Use Permit to put one of these facilities in, however we are still have to abide by the GAAMPs regulations. In our Township and others close by, we are seeing these facilities able to be built much to near residential homes. They must be controlled so that they are not allowed near residential areas where manure, water usage and odors effect the quality of life people living in rural areas are used to, just because the area is zoned for agriculture. In our Township we are seeing irrigation wells going in much to near residences. Too many wells in one area lower the water table and cause residential wells to go dry. In one case we had 8 wells go dry within a half mile of a new irrigation well recently drilled. The people involved all had to drill new wells and some had to take out a loan to do so. Our County Health Department seems to issue an irrigation well permit for anyone that applies for one with no regard to how many others are within close proximity to others.

We realize that farms are protected under the right to farm act but we also feel like we at the Township level should have more say in the matter as to where Livestock Production Facilities are located. Special Use permits do give us some say in the matter but we feel that the DOA allows them much too close to residential housing without any regard as to how many residences are effected. The Township Boards and Planning Commissions would have a much better feel for others who would be harmed by manure odors and drinking water pollution etc. We would like to have the final say in the matter where these facilities can be located.

With Best Regards
Jerry Rohde
Wheeler Township Supervisor

(5)

Ayers, Cheri (MDA)

From: Rachel Matthews <castironcook@hotmail.com>
Sent: Thursday, August 09, 2012 8:03 AM
To: Ayers, Cheri (MDA)
Subject: Public Comment on Site Selection GAAMPS

Categories: To do, Commiss Mtg/Action

Hello Cheri,

As requested last night at the Commission's meeting, I am submitting my simplified comments regarding the Site Selection GAAMPS to you via email. After looking at what I gave you at the meeting, I realized that changing the definition of Livestock Production Facility, instead of a couple other comments I had, would be cleaner.

Based on the way this GAAMPS is written, any number of animals in a high density location will most likely not meet GAAMPS (whether there is zoning or not) simply because of the "allowable" animal units. I propose the following changes in order to help protect citizens with a small number of animals (such as 4H families, people with a handful of backyard hens, etc.).

1. Page 3, definition of Livestock Production Facility: Change the definition to correspond with the minimum animal units as suggested in my next comments.

2. Page 6 and 7 Category 1 sites: Change 0-49 to 5-49.

3. Page 8 and 9, Category 2 sites: Change 0-49 to 3-49.

4. Page 10, first sentence after "Category 3 Sites:" add "over 2 Animal Units" at the end of the sentence.

5. Page 11, under paragraphs.

Thank you for the opportunity to comment. If you have any questions, you can contact me through my email by simply replying.

Best regards,

Rachel Matthews
131 Spring Street
Leslie, MI

2013 DRAFT Siting GAAMPs

from Rachel Matthews

A request to reduce the property line setbacks, as listed in Tables 2 and 3, will require the development of an OMP for verification. All verification requests for Category 1 sites with 1000 animal units or greater will require the development and implementation of an OMP to specify odor management practices that will provide a 95 percent odor annoyance-free level of performance as determined by the Michigan OFFSET odor model. For new livestock production facilities, a property line setback reduction shall only be considered for a proposed site in advance of MDARD site suitability approval. MDARD may grant a property line setback reduction of up to fifty percent of the setback distance in the following table when requested based upon the Odor Management Plan. For facilities with 50 animal units or more t~~T~~he minimum setback will be 250 feet for new livestock production facilities. Any reduction beyond this minimum will require a signed variance by the property owners within the original setback distance affected by the reduction. Factors not under direct control of the operator will be considered if an alternative mitigation plan is provided. Local land use zoning maps will be considered by MDARD in granting setback reductions.

Table 2. Category 1 Site Setbacks, Verification and Notification – New operations in areas where local zoning allows for agricultural uses

Total Animal Unit	New Operations Non-Farm Residences within Distance	Property Line Setback[1]	MDARD Site Review and Verification Process
0 - 49	0-5 within ¼ mile	100 ft	Upon Producer Request[2]
50-499	0-5 within ¼ mile	250 ft	Upon Producer Request[2]
500-749	0-5 within ¼ mile	400 ft	Yes
750-999	0-5 within ½ mile	400 ft	Yes
1000 or more	0-5 within ½ mile	600 ft	Yes

change from 0-49 to 5-49

[1]May be reduced or increased based upon the Odor Management Plan.

[2]~~To be afforded nuisance protection under the Right to Farm Act,~~ Producers must conform to these and all other applicable ~~requirements of the~~ GAAMPs but are not required to complete the site review and verification process if less than 500 animal units. See the Verification checklist at: www.michigan.gov/gaamps to ensure your property meets these standards. More information on the verification process is provided on page 14.

For expanding livestock production facilities, a variance for property line setback reduction shall only be considered for a proposed site in advance of MDARD site suitability approval. MDARD may grant a property line setback reduction of up to fifty percent of the setback distance in the following table when requested based upon the Odor Management Plan. For facilities with 50 animal units or more the minimum setback will be 125 feet for expanding livestock production facilities. Any reduction beyond this minimum will require a signed variance by the property owners that are within the original setback distance affected by the reduction. Local land use zoning maps will be considered by MDARD in granting setback reductions. Expanding livestock production facilities cannot utilize a property line setback less than the property line setback established by structures constructed before 2000 unless the established property line setback is greater than those distances identified in Table 3, in which case setbacks identified in Table 3 and the process detailed above will be used for determining conformance for new or expanding structures.

Table 3. Category 1 Site Setbacks, Verification and Notification – Expanding operations in areas where local zoning allows for agricultural uses

Total Animal Unit	Expanding Operations Non-Farm Residences within Distance	Property Line Setback[1]	MDARD Site Review and Verification Process
0-49	0-7 within ¼ mile	100 ft	Upon Producer Request[2]
50-249	0-7 within ¼ mile	125 ft	Upon Producer Request[2]
250-499	0-7 within ¼ mile	200 ft	Upon Producer Request[2]
500-749	0-7 within ¼ mile	200 ft	Yes
750-999	0-7 within ½ mile	200 ft	Yes
1000 or more	0-7 within ½ mile	300 ft	Yes

Change To 5-49 AU

[1] May be reduced or increased based upon the Odor Management Plan.

[2] ~~To be afforded nuisance protection under these GAAMPs~~ Producers must conform to these and all other applicable ~~requirements of the~~ GAAMPs but are not required to complete the site review and verification process if less than 500 animal units. See the Verification checklist at: www.michigan.gov/gaamps to ensure your property meets these standards. More information on the verification process is provided on page 14.

Category 2 Sites: Sites where special technologies and/or management practices may be needed to make new and expanding livestock production facilities acceptable.

Category 2 sites are those where site-specific factors may limit the environmental, social, or economic acceptability of the site for livestock production facilities and where structural, vegetative, technological, and management measures may be necessary to address those limiting factors. These measures should be incorporated into a Site Plan and a Manure Management System Plan, both as defined in Section IV, which are required for all new and expanding livestock production facilities seeking verification. New and expanding livestock production facilities should only be constructed in areas where local zoning allows for agriculture uses. Due to the increased density of non-farm residences in Category 2 sites, an OMP is required for all proposed new and expanding livestock production facilities.

Tables 4 and 5 show how Category 2 sites are defined and lists setbacks and verification requirements. As an example, a proposed site for an expanding livestock production facility (Table 5) with 500 animal units and between eight and 20 residences within ¼ mile of the facility, would have a setback of 200 feet from the owner's property line, and would be required to have a site verification request approved by MDARD. For new livestock production facilities, a property line setback reduction shall only be considered for a proposed site in advance of MDARD site suitability approval. MDARD may grant a property line setback reduction of up to fifty percent of the setback distance in the following table when requested based upon the Odor Management Plan. For facilities with 50 animal units or more the minimum setback will be 250 feet for new livestock production facilities. Any reduction beyond this minimum will require a signed variance by the property owners that are within the original setback distance affected by the reduction. Local land use zoning maps will be considered by MDARD in granting setback reductions.

Table 4. Category 2 Site Setbacks, Verification and Notification – New operations in areas where local zoning allows for agricultural uses

Total Animal Units	For new Operations Non-Farm Residences Within Distance	Property Line Setback[1]	MDARD Site Review and Verification Process
0-49	6-13 within ¼ mile	100 ft	Upon Producer Request[2]
50-249	6-13 within ¼ mile	250 ft	Upon Producer Request[2]
250-499	6-13 within ¼ mile	300 ft	Yes
500-749	6-13 within ¼ mile	400 ft	Yes
750-999	6-13 within ½ mile	500 ft	Yes
1000 or more	6-13 within ½ mile	600 ft	Yes

change To 3-49 A

[1] May be reduced or increased based upon the Odor Management Plan.

[2] ~~To be afforded nuisance protection under the Right to Farm Act,~~ Producers must conform to these and all other applicable GAAMPs but are not required to complete the site review and verification process if less than 250 animal units. See the Verification checklist at: www.michigan.gov/gaamps to ensure your property meets these standards. More information on the verification process is provided on page 14.

For expanding livestock production facilities, a property line setback reduction shall only be considered for a proposed site in advance of MDARD site suitability approval. MDARD may grant a property line setback reduction of up to fifty percent of the setback distance in the following table when requested based upon the Odor Management Plan. For facilities with 50 or more animal units the minimum setback will be 125 feet for expanding livestock production facilities. Any reduction beyond this minimum will require a signed variance by the property owners that are within the original setback distance affected by the reduction. Local land use zoning maps will be considered by MDARD in granting setback reductions. Expanding livestock production facilities cannot utilize a property line setback less than the property line setback established by structures constructed before 2000 unless the established property line setback is greater than those distances identified in Table 5, in which case setbacks identified in Table 5 and the process detailed above will be used for determining conformance for new or expanding structures.

Table 5. Category 2 Site Setbacks, Verification and Notification – Expanding operations in areas where local zoning allows for agricultural uses

Total Animal Units	For Expanding Operations Non-Farm Residences within Distance	Property Line Setback[1]	MDARD Site Review and Verification Process
0-49	8- 20 within ¼ mile	100 ft	Upon Producer Request[2]
50-249	8- 20 within ¼ mile	125 ft	Upon Producer Request[2]
250-499	8- 20 within ¼ mile	200 ft	Yes
500-749	8- 20 within ¼ mile	200 ft	Yes
750-999	8- 20 within ½ mile	250 ft	Yes
1000 or more	8- 20 within ½ mile	300 ft	Yes

change to 3-49 AU

[1] May be reduced or increased based upon the Odor Management Plan.

[2] ~~To be afforded nuisance protection under the Right to Farm Act,~~ Producers must conform to these and all other applicable GAAMPs but are not required to complete the site review and verification process if less than 250 animal units. See the Verification checklist at: www.michigan.gov/gaamps to ensure your property meets these standards. More information on the verification process is provided on page 14.

Add 1c of 2AU or more

Category 3 Sites: Sites generally not appropriate for new and expanding livestock production facilities. New and expanding livestock production facilities should not be ~~constructed~~ sited in areas where local zoning does not allow for agriculture uses.

New and expanding livestock production facilities of 2AU or more should not be ~~constructed~~ sited in areas where local zoning does not allow for agriculture uses. Any proposed site with more than the maximum number of non-farm residences specified in Table 4 for a new operation, and Table 5 for an expanding operation is a Category 3 site. New livestock production facilities are inappropriate for that site. However, expanding livestock production facilities may be acceptable if the farm submits an Odor Management Plan and site verification approval is determined by MDARD. In some cases, additional odor reduction and control technologies, and management practices may be necessary to obtain site verification approval. Additionally, the following land conditions ~~categories~~ are considered unacceptable for construction of new and expanding livestock production facilities.

1. Wetlands - New and expanding livestock production facilities shall not be constructed within a wetland as defined under MCL 324.30301 (NREPA, PA 451 of 1994, as amended).

2. Floodplain - New and expanding livestock production facilities and manure storage facilities shall not be constructed in an area where the facilities would be inundated with surface water in a 25 year flood event.

The following conditions ~~categories~~ require minimum setback distances in order to be considered acceptable for construction of new livestock production facilities. In addition, review and approval of expansion in these areas is required by the appropriate agency, as indicated.

1. Drinking Water Sources

   Groundwater protection - New livestock production facilities shall not be constructed within a ten year time-of-travel zone designated as a wellhead protection area as recognized by the Michigan Department of Environmental Quality (MDEQ), pursuant to programs established under the Michigan Safe Drinking Water Act, PA 399 of 1976, as amended. An expanding livestock production facility may be constructed with review and approval by the local unit of government administering the Wellhead Protection Program.

   Where no designated wellhead protection area has been established, construction of new and expanding livestock production facilities shall not be closer than 2000 feet to a Type I or Type IIa public water supply and shall not be closer than 800 feet to a Type IIb or Type III public water supply. A new or expanding livestock production facility may be located closer than these distances, upon obtaining a deviation from well isolation distance through MDEQ or the local health department. New and expanding livestock production facilities should not be constructed within 75 feet of any known existing private domestic water supply (wellhead).

Surface water protection - New and expanding livestock production facilities shall not be constructed within the 100 year flood plain of a stream reach where a community surface water source is located, unless the livestock production facility is located downstream of the surface water intake.

2. High public use areas - Areas of high public use or where a high population density exists, are subject to setbacks to minimize the potential effects of a livestock production facility on the people that use these areas. New livestock production facilities should not be constructed within 1,500 feet of hospitals, churches, licensed commercial elder care facilities, licensed commercial childcare facilities, school buildings, commercial zones, parks, or campgrounds. Existing livestock production facilities may be expanded within 1,500 feet of high public use areas with appropriate MDARD review and verification. The review process will include input from the local unit of government and from people who utilize those high public use areas within the 1,500 foot setback.

3. Residential zones - Areas zoned primarily for residential use will generally have housing at a density that necessitates setback distances for livestock production facilities to prevent conflicts. New livestock production facilities shall not be constructed within 1,500 feet of areas zoned for residential use where agriculture uses are excluded. ~~Existing livestock production facilities may be expanded within 1,500 feet of areas zoned for residential use with approval from the local unit of government.~~ what an odor mgt. plan

4. Migrant Labor Housing Camp – New and Expanding livestock production facilities shall be located a minimum of 500 feet from any existing migrant labor housing facilities, unless a variance is obtained from the United States Department of Labor.

July 20, 2012

To: Michigan Department of Agriculture

RE: Urban farming-chicken keeping in cities

Dear Sirs and Madames,

My name is Michelle Brejnak and I currently reside in New Baltimore, Michigan. We are located in northern Macomb county and we have just over 12,000 residents. I am writing to you to add my experience with my city and my recent efforts to change a current ordinance that does not allow for the keeping of chickens (domestic fowl). My hope is that MDRAD can assist me and many other urban farmers in our efforts to eat local, eat healthy.

This is the ordinance as it appears in our Code of Ordinances

Sec. 8-6. - Domestic animals and fowl.

No person shall keep or house any animals or domestic fowl within the city except dogs, cats, birds, fowl or animals commonly classified as pets

In May 2012 I emailed my State Representative Andrea LaFontaine to gain her support for backyard chicken keeping in urban settings as it is allowed according to the Michigan Right to Farm Act and provided her with references to precedent setting cases. Below is an excerpt of the data I provided. However, my intention has always to amend the current ordinance and not get into a MRTF debate/law suit with the City of New Baltimore. I have followed many Michigan citizens' harassment and legal battles with their cities/communities/townships over this issue. I wanted to be pro-active.

These court rulings are highlighted in the attached resource "Land Use Planning and the Right to Farm Act", http://www.animalagteam.msu.edu/uploads/files/20/Tech%20Bullitin%20Land%20Use.pdf

While I am going to attach the more pertinent documents, I will summarize some of the highlights of the RTFA and some of the case law that supports it as highlighted on page 6 of the attached resource. The Michigan Right to Farm Act was amended in 1999 to read:

Beginning June 1, 2000, except as otherwise provided in this section, it is the express legislative intent that this act preempt any local ordinance, regulation, or resolution that purports to extend or revise in any manner the provisions of this act or generally accepted agricultural and management practices developed under this act. Except as otherwise provided in this section, a local unit of government shall not enact, maintain, or enforce an ordinance, regulation, or resolution that conflicts in any manner with this act or generally accepted agricultural and management practices developed under this act.

This amendment was upheld in the following court cases:

- Milan Twp. V. Jaworski – concluding that a Milan Twp. Ordinance that limited hunting preserves to areas that are zoned agricultural conflicted with the RTFA "to the extent that it allows the township board to preclude this protected farm operation."

- Village of Rothbury v. Double JJ Resort Ranch – concluding that "an ordinance provision that only permits single family dwellings, playgrounds, and parks would prohibit farming operations, the ordinance provision conflicts with the RTFA and is unenforceable."

- Charter Township of Shelby v. Papesh – concluding that "...the RTFA no longer allows township zoning ordinances to preclude farming activity that would otherwise be protected by the RTFA. Rather, any township ordinance, including a zoning ordinance, is unenforceable to the extent that it would prohibit conduct protected by the RTFA." There has been no violation of the Domestic Animals Ordinance #13

- Papadelis v. City of Troy – concluding that a zoning ordinance "...limiting such activity to parcels with an area no less than five acres is preempted by the RTFA and is not enforceable."

I then presented my data to my city council providing many factual documents about the success other cities have that allow for urban chicken keeping. I included a retrospective study of 25 cities that had chicken keeping and what, if any, problems were documented. That same day I spoke to Andrea LaFontaine and she was supportive of my efforts to change the ordinance and allow for backyard chicken keeping.

I received notice that the vote for the ordinance change was to occur on July 9, 2012. In advance of this meeting I was informed by the city clerk that the planning commission had decided to NOT recommend an ordinance change and that the city council would vote in alignment with this recommendation. In advance of the city counsel meeting, I emailed all of the city council members re-stating the many benefits of urban chicken keeping and also provided them with the MRTFA documentation (and the legal cases to support it). I wrote:

> I have just been informed by Annette Girodat from the planning commission that my request for a change of ordinance regarding the keeping of chickens will be on the agenda at the next city council meeting. It is my understanding that the planning commission will NOT recommend the keeping of chickens in New Baltimore on the premise that allowing backyard chickens will attract pests. With the correct keeping of chickens using established guidelines this can be controlled. Moreover, all of our trash keeping is what is attracting pests as we chase out raccoons on a daily basis. Please don't let this weak argument be the deciding factor in an established successful method of keeping chickens.
>
> I submitted many documents for review and I feel that the 'leg work' of urban chicken keeping has already been done in many cities and this is an issue of HOW rather than YES or NO. Please refer to this specific document http://www.google.com/url?sa=t&rct=j&q=chicken%20keeping%20in%20city%20study&source=web&cd=1&ved=0CFIQFjAA&url=http%3A%2F%2F66.147.242.185%2F~urbanch5%2Fwp-content%2Fuploads%2F2012%2F02%2FOrdinance-research-paper.pdf&ei=adHyT-KlLoz6rAG-

tqyKCQ&usg=AFQjCNE-ArE_uYe4XcKDfhMrwSa4mOLfQw

Moreover, our city, is obviously reflecting the voice of the residents with a successful farmers market and a shared community garden. The movement of sustainable healthy living is not just a fad but one of necessity. The evidence of the multitude of health problems related to processed foods is well documented. I want to do what I can to provide healthy food for my family. Additionally, I have several friends that would be willing to purchase the extra eggs so as to not waste good food. If it would be possible, I would be interested in having space at the farmer's market on Sundays.

I chose this approach--one of coming together--citizen and elected officials-- to find mutual agreement for backyard chicken keeping based on established success in several cities. I do not want to become embroiled in a legal battle as I do not have the time or financial resources as I am the breadwinner in our family. I have researched and followed this movement and the court cases stemming from local ordinances.

The fact is that I did not need to have an ordinance changed as I am under the protection of the Michigan Right to Farm Act. http://legislature.mi.gov/doc.aspx?mcl-Act-93-of-1981
Under the Michigan Right to Farm Act, I may keep chickens as long as they are kept under the provisions of GAAMP (which is generally accepted farming practices)
http://www.michigan.gov/documents/mda/2010SITESELECTION-Draft_287011_7.pdf We follow the provisions of GAAMP as it applies to our farm operation.

In the end the city councel voted to not allow for backyard chicken keeping in New Baltimore despite my efforts to educate them and remind them of my legal rights. The city attorney did present a fairly standard 'chicken ordinance' document, but all that work was wasted as the council voted it down unanimously.

In conclusion, I wanted to inform you of my experience and what I did to inform, educate, and made positive changes in my city. I am seeking assistance in this matter as a Michigan resident. We have such strong right to farm laws in our state and I don't see why I have to enter into a legal battle when wording is so clear and precedent setting cases have been won over and over in favor of the farmer—no matter what size. Eating local is eating healthy.

Sincerely,

Michelle R. Brejnak

7

Casteel, Heather (MDA)

From: jeremy.snider@gulfstream.com
Sent: Tuesday, August 21, 2012 10:02 AM
To: Casteel, Heather (MDA)
Subject: Items for public input meeting.
Attachments: Genoa-20120810-00136.jpg; Mi well head dist. info.pdf

I have a few items I would like to be discussed for GAAMPS changes. I have listed them below and look forward to any questions you may have.

1. Fencing distance to a neighboring residence. I have a situation right now where a lot is 55 feet from my residence. I have asked the question and GAAMPS does not address this item. Before my neighbor put up the fence I made a complaint but I was not given a reason why this was granted to be OK. The fenced in area became bare dirt within a month and now there is
even more odor coming in my house then before. If this item is not
addressed in GAAMPS shouldn't the local township ordinance take precedence?

2. Set back distance from property line. In referencing GAAMPS, it shows that there is a set back if a pasture turns to a lot. I have asked this question to Dale Rosebloom and he has stated this is in GAAMPS and an expanding farm that has a pasture turn to a lot needs a set back of a certain distance. I have this case and was told that due to prevailing winds it doesn't matter. Again, I am 55 feet from this area and the odor is terrible. My neighbor is putting manure all along the property line which is causing the odor and also now making the fly population to come into my home where I cannot even enjoy my deck due to the odor and fly's.
I have attached a phot of the area and you can see that it has manure
stacked up 3" high. This was also a complaint that was discounted by the
inspector.
(See attached file: Genoa-20120810-00136.jpg)

3. Distance from well head to a lot. There is no reference in GAAMPS about this but there is in the Michigan dept of environmental quality. It
states a minimum of 50 Feet. The inspector did not even address this
because it is not in GAAMPS. Even after showing the inspector it was
discarded as not a GAAMPS issue. I have attached the document for you to
view.
(See attached file: Mi well head dist. info.pdf)

4. Number of animals allowed in an area. My neighbor has 7.5 acres which only 3.5 is fenced in. They have over 40 Alpacas on this area which is making the manure piles large and the odor great. If we are looking after the animals shouldn't there be a limit to the amount of animals the can be kept? When does a farm become a puppy mill? If a farmer cannot take care of the manure and it is causing problems it needs to be addressed and the only way is to put a limit on the amount of animals kept on these small farms.

5. Animals causing damage to neighbors property. Due to the fence area my neighbor has that is right on the property line, the animals are eating my trees and causing them to die. When I brought this up in my complaint it
was also discounted. This goes along with my setback question. If there
is a minimum setback on all property lines there is no chance of this happening.

Jeremy Snider
Sr. Regional Sales Manager
Central Service Center Sales and Product Support.
(517)-304-5347 Mobile
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MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER AND RADIOLOGICAL PROTECTION DIVISION
GROUND WATER SUPPLY SECTION –WELL CONSTRUCTION UNIT

MINIMUM WELL ISOLATION DISTANCES
(From Contamination Sources and Buildings)
Part 127, Act 368, P.A. 1978 And Act 399, P.A. 1976

The following lists sources of contamination and the well isolation distances required from those sources by state codes. The Michigan Department of Environmental Quality and local health departments have authority to issue deviations from these minimum isolation distances on a case by case basis. Criteria for issuance of deviations are set forth in R 325.1613 of the Rules for Part 127, and R 325.10809 of the Rules for Act 399.

* = For the isolation distances marked with a single asterisk, the isolation distance is for a source of contamination which is not specifically listed in the rules. However, the source of contamination is interpreted as belonging in a general contamination source group (example - a sewage holding tank is the same as a septic tank) which is listed in the rules, and therefore, the isolation distance listed in this document is required.

** = For the isolation distances marked with a double asterisk, the isolation distance is from a source of contamination which is not specifically named in the rules. However, the Michigan Department of Environmental Quality has established a recommended isolation distance based on the contaminant involved, the risk to public health, and other factors. Under the general authority of a health officer's responsibility to protect the public health, health officers may modify this recommended isolation distance, either increasing or decreasing it, on a case by case basis.

	REQUIRED MINIMUM ISOLATION DISTANCE (FEET)		
Contamination Source	**Part 127, Act 368 PA 1978**	**Act 399, PA 1976**	
		IIb and III	I and IIa
Agricultural chemical/ fertilizer storage or preparation area	150	800	2000
Animal/poultry yard	50	75	200
Brine wells/injection wells	**150	**800	**2,000
Building or projection thereof	3	3	3
Cemetery/graves	**50	*75	*200
Cesspool	50	75	200
Chemical Storage	150	800	2,000
Contaminant plumes, known (Act 307, LUST sites, etc.)	**150	**800	**2,000
Drainfield	50	75	200
Drywell	50	75	200
Footing Drains	10	10	10

Fuel/chemical storage tanks – Underground or abovegrade and associated piping			
depot/tank farm	300	800	2,000
1,100 gal. or larger, without secondary containment	300	800	2,000
1,100 gal. or larger with secondary containment	50	800	2,000
less than 1,100 gal. which store motor or heating fuel for noncommercial purpose or consumptive use on premises where fuel is stored	50	800	2,000
less than 1,100 gal. which store motor fuel for commercial purpose	*50	800	2,000
located in a basement, regardless of size	*50	800	2,000
Grease trap	50	*75	*200
Kennels	50	*75	*200
Landfill or dump sites (Active or inactive)	800	800	2,000
Liquid Petroleum (LP) Tanks See comments on last page			
Liquid waste draining into the soil	50	*75	200
Metering station for pipelines	*300	*300	*300
Municipal wastewater effluent or sludge disposal area (land surface application or subsurface injection)	300	800	2,000
Oil or gas wells	300	300	300
Other wastewater handling or disposal unit	50	*75	*200
Petroleum product processing or bulk storage	300	800	2,000
Pipelines			
gas, oil, etc.	*300	*300	*300
natural gas (See comments on last page)			
Privy/Outhouse	50	75	200
Seepage pit	50	75	200
Septic tank	50	75	200
Septage waste (land application area)	800	800	2,000
Sewage holding tank	50	*75	*200
Sewage lagoon serving a single family dwelling	50	75	200
Sewage lagoon effluent – land application area	50	800	2,000

Sewage pump chamber, transfer station, or lift station	50	75	200
Sewers			
Buried gravity sewer (sanitary or storm) - Service weight or heavier ductile-iron or cast iron, or schedule 40 PVC, all with watertight joints	10	75	200
Buried pressure sewer (sanitary or storm) Watertight joints (pressure tested after installation to 100 psi), equivalent to Schedule 40 or SDR 21, and meets or exceeds ASTM Specifications D1785-91 or D2241-89	10 (by written deviation only)	75	200
Buried gravity or pressure sewer (sanitary or storm), constructed of materials not meeting the specifications listed in the two categories above, or the materials are unknown	50	75	200
Sump pit			
Receiving other than household waste (footing drain, roof drain, etc.)	10	10	10
Receiving household waste (laundry, softener backwash, sink waste, etc.)	50	75	200
Surface water (lake, river, stream, pond, ditch, etc.)	10	75	200
Unfilled space below ground surface (except an approved basement, basement offset, or crawl space beneath single family dwelling)	10	10	10

Comments: Natural gas and liquid petroleum (LP) are not considered sources of ground water contamination because of the volatile gas nature of the fuels. If leaks occur, the gases escape into the atmosphere. Leaked gases do not migrate downward into the soil. Wells should be sufficiently isolated from natural gas lines or LP tanks to minimize the potential for damage to the lines or tanks during well construction or repair, trenching of water lines, etc., and to allow accessibility to the well.

Casteel, Heather (MDA)

From: karen rice <klrinthewoods@gmail.com>
Sent: Tuesday, August 21, 2012 8:51 PM
To: Casteel, Heather (MDA)
Subject: Right to Farm Act of 1981

I am a resident of Antrim County living between Elk Rapids & Charlevoix. I am writing to express my dismay and irritation for the way local farmers abuse the right to use orchard canons to "preserve" their crops. The farmers blow the cannons off night and day, around the clock, every day, all week-end, every 13 seconds or 5, 8, 10 minutes. My research found the over-use of these orchard cannons makes them completely useless for the purpose of keeping animals and birds out of the crops. It takes a very short time of repetition for the animals & birds to become used to the sounds. **The area is like a combat zone**. We live with this constant assault because of an out dated and abused law.

This Right to Farm Act of 1981 is antiquated. Is it even older than 1981? Just the change in population alone since 1981 to present date should be a clue for the need to change. Not having any rules and/or restrictions to the use, positioning, volume and safety of these cannons makes it as open to abuse as the fireworks law debacle.

There are other, more effective ways of dealing with crop invasion. One tried and true method used by some vintners on the Leelanau Peninsula is the broadcast of predatory bird recordings. This equipment is cheaper to use, invest in, and safer for all than the over-use of propane.

If this cannon method is so fabulous than why don't all farmers, everywhere, use it?

Please consider changing this law so that all residents can live in this community, and others, without the unwelcome invasion of all day and all night explosions. Attempts have been made to allow harmonious living...no luck.

Thank you for your time and attention. Please consider the harmful effects this antiquated law is causing the environment, all animals and the general populations.

Thank you,
Karen Rice
231-264-6774

(9)

Deacon, Brad (MDA)

From: Casteel, Heather (MDA)
Sent: Wednesday, August 22, 2012 5:00 PM
To: Deacon, Brad (MDA); Whitman, Wayne (MDA)
Subject: FW: changes

FYI below.

Heather

-----Original Message-----
From: Patricia Fraser [mailto:celticrone@gmail.com]
Sent: Wednesday, August 22, 2012 4:59 PM
To: Casteel, Heather (MDA)
Subject: changes

I appreciate the opportunity to make public my concerns regarding the proposed changes to the 2013 GAAMPs. Upon reviewing the proposed language in the site selection GAAMPs it appears that these changes will effectively undo the progress of the 1999 MRFTA in both spirit and intent of the law.

The Michigan Right to Farm has been touted as the best farm right's law in the nation. To weaken it now would be devastating to everyone in Michigan who is involved in agriculture. The new changes only protect those citizens living in a zoned agriculture area. This precludes 80% of the state's population. These changes would effectively eliminate future farmers from learning and developing good agriculture habits, good animal husbandry, and good management practices. The only people that would be permitted to learn these skills are the people who already live in an agriculture zone. Or may be lucky enough that local officials have the foresight to allow for small or "hobby" farms that consist of small garden plots and low number of animal units.

The original intent of the RTF was to establish a state-wide set of practices that are consistent and based on sound scientific research and evolution of best practices as they develop over time. To revert to the ignorance, whims, or political agendas of local governing bodies will result in back-sliding to the same conditions that brought about the original RTF (Act 93) of 1981. As agriculture research evolved and became better informed so too did the law, which was amended in 1999 and clearly states that the law supersedes any attempt by local ordinance to by-pass the intent.

The GAAMPs changes that occur each year are meant to educate the agriculture community, as well as the public at large and provide best practices so that our producers are more effective. The proposed 2013 changes do not support this ideal.
I urge you to consider suspending the proposed changes to the GAAMPs and allow for revisions that keep state law as the uniform benchmark and to consider addressing the growing number of hobby or backyard agriculturists.

Pat Fraser

MICHIGAN FARM BUREAU®
7373 West Saginaw Highway, Box 30960, Lansing, Michigan 48909-8460
Phone (517) 323-7000

August 22, 2012

Wayne Whitman, Manager
Right to Farm Program
Michigan Department of Agriculture
Environmental Stewardship Division
PO Box 30017
Lansing, MI 48909

Dear Mr. Whitman,

The following are comments of the Michigan Farm Bureau regarding the annual review of the Generally Accepted and Agricultural Management Practices (GAAMPs) as developed under the authority of the Michigan Right to Farm Act, 1981 PA 93 as amended. We believe Michigan's Right to Farm is the model for our country. The Act has allowed all sectors of Michigan agriculture to move forward utilizing GAAMPs on a voluntary basis while enhancing the environment. Michigan Farm Bureau appreciates the opportunity to comment on the proposed changes. Comments are arranged in accordance with the applicable set of GAAMPs.

Manure Management

- We have no comments since the 2013 draft contains no changes to the current GAAMP.

Site Selection

- MFB is concerned about applying the site selection GAAMPs to all farms regardless of size. We're concerned that unintended consequences may occur pursuant to this change.
- We support the option to ask MDARD for a two-year extension to begin new construction (page 15).

Pesticide Utilization/Pest Control

- We have no comments since the 2013 draft contains no changes to the current GAAMP.

Care of Farm Animals

- We continue to work and support the makeup of the current committee and are supportive of the changes.

Farm Market

- We support the change of definition to the word "affiliated" as we feel the new proposed definition is clearer and more concise (page 2).

Irrigation Water Management

- We have no comments as no substantive changes were made from the 2012 GAAMP to the proposed draft.

Comments applicable to all GAAMPs

We recognize that the Michigan Commission of Agriculture is required to review the GAAMPs annually, but does that mean the GAAMP Advisory Committees also need to meet annually? Would it be possible for GAAMP committees to meet every other year, rather than annually, which would provide farmers more consistent standards to follow.

Thank you for your consideration of these comments. Please call me with questions.

Regards,

Matthew Kapp

Matthew D. Kapp
Land Use Specialist

Deacon, Brad (MDA)

From: Jen Jewett <jjewettbsn@gmail.com>
Sent: Wednesday, August 22, 2012 3:42 PM
To: Deacon, Brad (MDA)
Subject: proposed changes to GAAMPs

Bradley N. Deacon, J.D.

I live in Sterling Heights and have 3 hens that I am trying to keep. The city has a radically restrictive ordinance that I am trying to counter. The proposed changes to GAAMPs will strip me of my rights protected under the MTRTFA. Being that there are no provisions for backyard farmers these changes would make it impossible for my children to participate in 4-H or cultivate any interest in agriculture. The message I am getting is MDARD doesn't want small urban farms nor do they see the small scale production of farm goods as worthy of protection? Who is the MRTFA and GAAMPs for if not me and mine, nor my neighbors and friends?

Jennifer Jewett
37369 Streamview
Sterling Heights, MI 48312

Deacon, Brad (MDA)

From: Casteel, Heather (MDA)
Sent: Wednesday, August 22, 2012 3:14 PM
To: Deacon, Brad (MDA); Whitman, Wayne (MDA)
Subject: FW: changes to GAAPS 2013

FYI below.

Heather Casteel
Heather Casteel
Michigan Department of Agriculture
& Rural Development
Environmental Stewardship Division
MAEAP and RTF Programs
Ph: 517-373-9797
Fax: 517-335-3329
CasteelH@michigan.gov
www.michigan.gov/maeap
www.maeap.org

-----Original Message-----
From: Jen Jewett [mailto:jjewettbsn@gmail.com]
Sent: Wednesday, August 22, 2012 2:52 PM
To: Casteel, Heather (MDA)
Subject: changes to GAAPS 2013

I am against the changes proposed for GAAMPS 2013. These changes will strip my protection under the MRTFA as a small urban farmer. Particularly of concern is the changes regarding poultry. My 3 hens would be lumped in with animal production facilities with >5000 hens. Why are there no provisions for the backyard farmer who is concerned with producing quality food for their friends, family and neighbors? Why is the MDARD trying to harm everyone's ability to participate in agriculture? Why is there no protection offered to the great and small? How do I explain to my children that the great State of Michigan doesn't want them to be able to participate in 4-H?

Jen Jewett
37369 Streamview
Sterling Heights, MI 48312
586-439-8015

(12)

Deacon, Brad (MDA)

From: Casteel, Heather (MDA)
Sent: Wednesday, August 22, 2012 3:33 PM
To: Deacon, Brad (MDA); Whitman, Wayne (MDA)
Subject: FW: changes to GAAMPS

FYI below.

Heather Casteel

Heather Casteel
Michigan Department of Agriculture
& Rural Development
Environmental Stewardship Division
MAEAP and RTF Programs
Ph: 517-373-9797
Fax: 517-335-3329
CasteelH@michigan.gov
www.michigan.gov/maeap
www.maeap.org

From: Michael Alan Phillips [mailto:mrphillips4009@gmail.com]
Sent: Wednesday, August 22, 2012 3:25 PM
To: Casteel, Heather (MDA)
Subject: changes to GAAMPS

I have concerns regarding the proposed changes to the 2013 GAAMPs. Upon reviewing the proposed language in the site selection GAAMPs it appears that these changes will effectively undo the progress of the 1999 MRFTA in both spirit and intent of the law.

The Michigan Right to Farm has been touted as the best farm right's law in the nation. To weaken it now would be devastating to everyone in Michigan who is involved in agriculture. The new changes only protect those citizens living in a zoned agriculture area. This precludes 80% of the state's population. These changes would effectively eliminate future farmers from learning and developing good agriculture habits, good animal husbandry, and good management practices. The only people that would be permitted to learn these skills are the people who already live in an agriculture zone. Or may be lucky enough that local officials have the foresight to allow for small or "hobby" farms that consist of small garden plots and low number of animal units.

The original intent of the RTF was to establish a state-wide set of practices that are consistent and based on sound scientific research and evolution of best practices as they develop over time. To revert to the ignorance, whims, or political agendas of local governing bodies will result in back-sliding to the same conditions that brought about the original RTF (Act 93) of 1981. As agriculture research evolved and became better informed so too did the law, which was amended in 1999 and clearly states that the law supersedes any attempt by local ordinance to by-pass the intent.

The GAAMPs changes that occur each year are meant to educate the agriculture community, as well as the public at large and provide best practices so that our producers are more effective. The proposed 2013 changes do not support this ideal.

I urge you to consider suspending the proposed changes to the GAAMPs and allow for revisions that keep state law as the uniform benchmark and to consider addressing the growing number of hobby or backyard agriculturists.

Michael Alan Phillips
37369 Streamview
Sterling Heights, MI 48312

13

Deacon, Brad (MDA)

From: Casteel, Heather (MDA)
Sent: Wednesday, August 22, 2012 3:13 PM
To: Deacon, Brad (MDA); Whitman, Wayne (MDA)
Subject: FW: GAAMP

FYI below

Heather Casteel

Heather Casteel
Michigan Department of Agriculture
& Rural Development
Environmental Stewardship Division
MAEAP and RTF Programs
Ph: 517-373-9797
Fax: 517-335-3329
CasteelH@michigan.gov
www.michigan.gov/maeap
www.maeap.org

From: Racheal Blouse [mailto:beautifulkisses1313@yahoo.com]
Sent: Wednesday, August 22, 2012 2:53 PM
To: Casteel, Heather (MDA)
Subject: GAAMP

The Michigan Commission of Agriculture and Rural Development and the Michigan Department of Agriculture and Rural Development (MDARD) is meeting today about the proposed changes to the state's Generally Accepted Agricultural and Management Practices (GAAMPs). The changes they propose strip urban farmers of their protection under the Michigan Right to Farm Act.

Please help us keep our pets. Keeping farm animals are no different from keeping the "normal" house pets. Please have a heart. Thank you.

Deacon, Brad (MDA)

From: Randy Zeiliner <rzeilinger@wideopenwest.com>
Sent: Wednesday, August 22, 2012 2:53 PM
To: Deacon, Brad (MDA)
Subject: GAAMPs Proposed Changes 2013

Bradley N. Deacon, J.D.

Constitution Hall

525 West Allegan St.

P.O. Box 30017

Lansing, MI 48909

Dear Mr. Deacon,

I appreciate the opportunity to make public my concerns regarding the proposed changes to the 2013 GAAMPs. Upon reviewing the proposed language in the site selection GAAMPs it appears that these changes will effectively undo the progress of the 1999 MRFTA in both spirit and intent of the law.

The Michigan Right to Farm has been touted as the best farm right's law in the nation. To weaken it now would be devastating to everyone in Michigan who is involved in agriculture. The new changes only protect those citizens living in a zoned agriculture area. This precludes 80% of the state's population. These changes would effectively eliminate future farmers from learning and developing good agriculture habits, good animal husbandry, and good management practices. The only people that would be permitted to learn these skills are the people who already live in an agriculture zone. Or may be lucky enough that local officials have the foresight to allow for small or "hobby" farms that consist of small garden plots and low number of animal units.

The original intent of the RTF was to establish a state-wide set of practices that are consistent and based on sound scientific research and evolution of best practices as they develop over time. To revert to the ignorance, whims, or political agendas of local governing bodies will result in back-sliding to the same conditions that brought about the original RTF (Act 93) of 1981. As agriculture research evolved and became better informed so too did the law, which was amended in 1999 and clearly states that the law supersedes any attempt by local ordinance to by-pass the intent.

The GAAMPs changes that occur each year are meant to educate the agriculture community, as well as the public at large and provide best practices so that our producers are more effective. The proposed 2013 changes do not support this ideal.

I urge you to consider suspending the proposed changes to the GAAMPs and allow for revisions that keep state law as the uniform benchmark and to consider addressing the growing number of hobby or backyard agriculturists.

Thank you for your time and consideration,

Randy Zeilinger

rzeilinger@wideopenwest.com

5839 Helen

Garden City, MI 48135

(734) 255-2440

15

Deacon, Brad (MDA)

From: Casteel, Heather (MDA)
Sent: Wednesday, August 22, 2012 2:16 PM
To: Deacon, Brad (MDA); Whitman, Wayne (MDA)
Subject: FW:

FYI regarding GAAMPs below.

Heather Casteel

Heather Casteel
Michigan Department of Agriculture
& Rural Development
Environmental Stewardship Division
MAEAP and RTF Programs
Ph: 517-373-9797
Fax: 517-335-3329
CasteelH@michigan.gov
www.michigan.gov/maeap
www.maeap.org

From: Alane Goins [mailto:alanegoins@yahoo.com]
Sent: Wednesday, August 22, 2012 2:14 PM
To: Casteel, Heather (MDA)
Subject:

The proposed changes will take away our protection under the michigan right to farm act to have back yard chickens in your community and make it almost impossible for your children friends and neighbors to participate in agriculture. Please reconsider the proposed changes and help to keep small home farming.
Thank you
Alane Goins

16

Deacon, Brad (MDA)

From: Casteel, Heather (MDA)
Sent: Wednesday, August 22, 2012 1:06 PM
To: Deacon, Brad (MDA); Whitman, Wayne (MDA)
Subject: FW: Public Comment: GAAMPs, MRTFA Changes

FYI below

Heather Casteel
Heather Casteel
Michigan Department of Agriculture
& Rural Development
Environmental Stewardship Division
MAEAP and RTF Programs
Ph: 517-373-9797
Fax: 517-335-3329
CasteelH@michigan.gov
www.michigan.gov/maeap
www.maeap.org

-----Original Message-----
From: Mark Jewett [mailto:msjewett@gmail.com]
Sent: Wednesday, August 22, 2012 12:59 PM
To: Casteel, Heather (MDA)
Subject: Public Comment: GAAMPs, MRTFA Changes

I do not support the proposed changes to the GAAMPs, relative to the Michigan Right to Farm Act.

My family resides in Sterling Heights, and my son - from a very early age - showed a real talent for growing plants and tending to the needs of animals. We built a small chicken coop, where he is able to tend to a few chickens (three - we're not talking about a huge operation here). We have learned so much in the process of raising these chickens, taking care of their needs and even harvesting the eggs.
There's nothing quite like having breakfast, with tomatoes and herbs from your own garden, and eggs from your own chickens. We don't have any roosters, so the chickens are very quiet, the environmental impact is insignificant as their total food consumption and waste production are less than one medium-sized dog.

The proposed changes will lump my son's three hens in the same category as large farms with more than 5,000 chickens. Clearly, this doesn't make any sense. It defeats the intended purpose of the Michigan Right to Farm Act and will be devestating to educational programs like the 4-H Club... not to mention devestating to my son, who I sincerely hope continues to cultivate an interest in growing things, taking care of animals and farming the land. I, personally, don't even like weeding the flower gardens in the front yard - but who am I to tell my son that he can't pursue his love of farming, even if I can't move the whole family out to the country. For that matter, why would the Agriculture Commission want to take that opportunity away? Isn't that the whole idea of Agriculture? Learning to love the land, and help things grow?

Thank you for your time and consideration.

Mark Jewett
40652 Firesteel Drive
Sterling Heights, MI 48313
586-212-2656

(17)

Deacon, Brad (MDA)

From: Casteel, Heather (MDA)
Sent: Wednesday, August 22, 2012 12:52 PM
To: Deacon, Brad (MDA); Whitman, Wayne (MDA)
Subject: FW: Proposed 2013 Site Selection GAAMPS

FYI below.

Heather Casteel

Heather Casteel
Michigan Department of Agriculture
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From: Cara Baker [mailto:caramcbaker@gmail.com]
Sent: Wednesday, August 22, 2012 12:04 PM
To: Casteel, Heather (MDA)
Subject: Proposed 2013 Site Selection GAAMPS

I am writing to express my concern with regards to proposed changes to the Site Selection GAAMPS for 2013.

The proposed changes to the GAAMPS will eliminate any and all possibility for the growth of urban farming in Michigan. This is unacceptable.

Michigan's long history of agriculture, combined with one of the strongest Right to Farm Acts, makes the rising trend of urban farming a possibility in this state. More and more Michigan cities are adopting ordinances to allow 'backyard chickens', and our Farmers Markets are crowded with demand for locally grown and produced products.

The Right to Farm Act currently protects commercial farming in ALL areas (regardless of local zoning, etc). This law has been upheld in multiple court rulings, including:

- Milan Twp. V. Jaworski – concluding that a Milan Twp. Ordinance that limited hunting preserves to areas that are zoned agricultural conflicted with the RTFA "to the extent that it allows the township board to preclude this protected farm operation."
- Village of Rothbury v. Double JJ Resort Ranch – concluding that "an ordinance provision that only permits single family dwellings, playgrounds, and parks would prohibit farming operations, the ordinance provision conflicts with the RTFA and is unenforceable."
- Charter Township of Shelby v. Papesh – concluding that "...the RTFA no longer allows township zoning ordinances to preclude farming activity that would otherwise be protected by the RTFA. Rather, any township ordinance, including a zoning ordinance, is unenforceable to the extent that it would prohibit conduct protected by the RTFA."
- Papadelis v. City of Troy – concluding that a zoning ordinance "...limiting such activity to parcels with an area no less than five acres is preempted by the RTFA and is not enforceable."

It is proven possible to run a successful commercial farming operation in residentially-zoned areas, while still complying with applicable GAAMPS (Papesh family farm in Shelby Township).

You are taking away my right to feed my family with eggs and chickens, and to sell eggs to the public, by eliminating my ability to establish a small urban vegetable and chicken farm on my property.

I am already fighting with my city with regards to my proposed farming options, as they are knowingly disregarding the current law and court decisions with regards to the MRTFA.

A proposed change to Site Selection for animal units of 0-49 (with regards to poultry) means that I must comply with the same regulations for my 10 chickens, as someone with nearly 5,000. This is unreasonable and unrealistic. It is proven that chickens can be more than adequately raised in an urban environment with no negative neighborly or environmental impacts. More and more cities are passing chicken ordinances to allow such a practice, but they cannot be depended upon to do so. The MDRDA is charged with promoting and protecting agriculture, and urban agriculture must fall under their charge as well.

I implore you to remove the proposed changes to the 2013 Site Selection GAAMPS and reaffirm the MRTFA and the current court precedent to protect urban farming and encourage it...perhaps a set of Urban Agriculture GAAMPS are appropriate. New GAAMPS can address smaller animal units, as well as space and facilities needed to establish an urban farm. I know that there is objection to allowing any and all commercial farming in urban areas - if we allow chickens, then why not cows and goats? Larger livestock require larger accessory buildings and pasturing, etc. that can be established in designated GAAMPS to address those concerns. When property/sites allows for it, even urban farms with large livestock need to be protected.

The currently proposed Site Selection GAAMPS will be 2 steps backwards with regards to farming in Michigan. They must not be adopted.

Thank you for your attention to my concerns.

Cara Baker
1206 Kingsbury Court
Midland, MI 48640